AMERICAN

STATISTICAL ASSOCIATION.

NEW SERIES, No. 41. MARCH, 1898.

OBSTACLES TO ACCURATE STATISTICS.*

By James H. Blodgett.

In statistical work we should be able to presume upon honesty, fidelity, and diligence. It adds something, indeed, to the embarrassments of statistical research that checks must be devised to guard against dishonesty, negligence, and carelessness, as well as against accident.† It is not, however, the present intention to dwell upon what may be called details of administration, but rather to speak of matters which must be settled in general plans of work.

It might be supposed that an enumeration of the people was a very simple thing, involving merely a counting of persons in a given area. In point of fact, however, no census of the United States has yet been taken which did not allow a considerable range of dates for the facts. Even the local censuses, taken in many parts of the Union for school purposes at brief intervals, often absorb a fortnight on a given area. Between the beginning and the close of such a count, births have tended to increase and deaths to decrease the total. In like manner changes of habitation have had some

* Presented at the Meeting in Washington, December 23, 1897.

† The author's most scrupulous care sometimes fails against mechanical accident. Not to name personal experiences where some displacement has occurred after final proofs were correct, a recent case is easily found in *The Independent*, January 6, 1898, in a table clearly prepared to show Presbyterian (northern) communicants: 1896, 923,515; 1897, 939,299, which latter stands as 39,299.

effect. It has been a complaint that in the month of June, when national counts have been made, the population of certain cities was considerably depleted by the departure of those who had gone for the season to work in the country or who had departed on journeys. It has been further said that not only are the conditions adverse to the showing for such a city, but farmers and entertainers often treat those newly come among them as transient non-residents and do not report them, so that any such omission affects the reported grand total of population. In general, those absent from home for periods covering the date of the census are liable to be omitted from the count in places of temporary sojourn without being credited to their places of legal residence.

Our methods are unlike those of various foreign countries. In the census of India, in Bengal, for example, in 1881, steps were taken to cover all cases so effectually that every one in the country on a given night was believed to be recorded, travelers on river boats or railways included, thus losing, as the officials claimed, from a direct count only those absent on voyages by sea. The French discriminate between actually present and the legal population. The latter is swollen by the number of French citizens abroad, amounting in 1891 to over half a million * (517,000).

In the matter of personal enumeration a suggestion has been repeatedly made that teachers might be advantageously utilized as the basis of the enumerating force. Probably it would be possible in some States and parts of States to obtain valuable results in that way, but there are large areas where schools are transient or wanting to such an extent that teachers might not be available when needed. It is quite worth considering whether the justice of the peace, the police magistrate of the smallest civil unit, with the constables in his jurisdiction, who are permanent residents, and acquainted with the by-places of human habitation in their vicinity, could not be utilized helpfully.

* *Statesman's Year-Book*, 1897, p. 472, in a total of 38,342,948.

When the enumerator passes from the count of items perceptible to him, like number, color, and sex; when he questions as to age, occupation in the past year, and so on, difficulties arise familiar to every one who has given this class of subjects close attention. Few persons, called on to state how the past twelve months have been distinguished in any way, can feel quite sure whether something familiar in their general remembrance occurred within a year or over a year ago. In the census of 1880 Dr. John S. Billings found this lack of identification of events with dates a serious difficulty in determining the value of physicians' returns. Preparatory to the census of 1890 he sent out to the profession blank forms on which they might record cases as they occurred, and in due time have an authentic history of the year's practice from which to fill a blank inquiry. Whatever added value there may have been in health or mortuary reports, the step taken was an important one in educating at least one group of the people, in making trustworthy records as a basis of trustworthy returns.

In this country there has been some disposition to despise family records and parish registries as savoring too much of the worship of ancestors. During the war of the rebellion those in the midst of its destruction saw the value of personal identification to the soldier separated by any exigency from his command. If a man was left in a hospital or sent on detached duty he was furnished with a descriptive roll giving his personal description as it appeared on the muster rolls and the condition of his accounts. With this statement, and proper authority for his presence, he could draw pay or clothing, according to his dues, wherever he found disbursing officers or quartermasters. Without the roll he was subject to great inconvenience or delay in satisfying his claims, if, indeed, he could secure any recognition of them.

It seemed to many that the day was at hand when the American people would keenly appreciate the need of responsible records of marriages and authentic registries of births and deaths. The pension roll was sure to be formi-

dable after the first few months revealed the probable magnitude of the war, and it was anticipated that proof of relationship would be of an importance. More than a generation has passed and we have made small gain. So far, indeed, as families once kept records in the big Bible, it is a question if the custom has not declined. Even when rules and regulations are put upon the statute book public sentiment does not recognize the importance of obedience to the requirements.

The income tax in force at the close of the war seemed likely to stimulate attention to definite private accounts, but it was presently abandoned before it had a permanent educative effect. The enormous sums absorbed in charities and pensions begin to startle the public, and a disposition is manifest that may encourage better registration for the clearer identification of the rightful inheritors of property or claimants for gratitude and support.

Many items have specific limitations as to the accuracy with which they can be reported. Thus the products consumable where raised cannot be so accurately or so readily determined as those which from the conditions must be brought together at factories or at shipping points. Changes arise modifying the readiness with which account can be taken of given products. Before the war of the rebellion the amount of cotton consumed in cotton-producing States was very small, and we could determine quite closely the total product when we knew the amount shipped from a few points to the North or abroad. The ease of such a collection of data had been slightly modified by the erection of factories remote from the seaboard and receiving the raw material by inland transportation, but the modification was insignificant compared with that which has come by the increase of shipping points and by the establishment of factories among the cotton fields. On the other hand, statistics of wool and of wheat can probably be gained more readily than in the days when a common arrangement at a convenient waterpower, in Ohio, for example, was a saw mill, a grist mill, and a carding factory, with a fulling

mill attachment, all for custom work. Even the farmer who raises wheat today sells his wheat and buys his flour. In like manner he sells his wool and buys his cloth. Wheat and wool thus come more prominently into view in accumulated masses for transportation or manufacture, while corn, still largely fed to animals on the farm, and used in varied forms upon the farmer's table, is more nearly in the condition of ante bellum times.

Not only is completeness of record necessary to accuracy of statistics; the records of different localities to be compared or combined must be in the same form, or convertible to the same form, or the result will be defective. The State of Delaware keeps its school records in a form to show how many positions are occupied by teachers of each great race and of each sex. No account is made of changes of individuals by substitution during the year. In certain States the person is made prominent, and a school that at no time employed more than one teacher is liable to have a return of several teachers, according to changes from any cause during the school year. There is no uniformity of age for school attendance in the United States. In Massachusetts any one is allowed to attend, and his attendance is part of the record. In Texas return is not generally made in public records of those under eight or over sixteen years of age. Various independent districts in Texas have been empowered to make local rules for attendance, rules which are not uniform with one another nor with the State law. How can any proper comparison be made between Massachusetts and Texas, or between different localities in Texas, as to school enrolment? In certain parts of the country each group under a teacher who keeps an independent record is called a school, and there may be a dozen schools in one great building. Elsewhere may be found assemblages of pupils under one management called a school, occupying more than one building. How then can the number of school houses be derived from the number of schools? If we knew the number of schoolhouses, of what value would the bare number be without any discrimination between the

one-room house with a dozen pupils and the great city building with thousands of pupils and scores of teachers? There are very few items pertaining to education which can be tabulated on the same basis for the whole country, owing to the different terms used, the different age limits, the different sources of funds, and the different customs as to titles of school property in different parts of the country. Tables made to show the conditions require numerous remarks and explanations in adjacent text to warn the reader of their limitations, and these remarks and explanations are often ignored by those who cite the tables.

In passing, it may be noted that the customs of the South, in general, are to her undue disadvantage in comparison of public educational records. At the North, and in certain localities of the South, schoolhouses are recognized in the records as public property, and the schools are free for the school year. To a great extent, however, at the South, the neighborhood has erected its schoolhouse by unrecorded effort and expense, and has added to the public money by tuition or by contribution, which does not appear in the records of maintenance.

A disadvantage of imperfect current statistics is the unfavorable effect of increasing truthfulness upon comparisons. When in 1887 authorities in Pennsylvania struck 70,000 off the school returns of Philadelphia for duplicated enrolment, it was to that extent unfavorable for comparison with the previous year, and yet attendance evidently kept pace with the growth of the city; but an attempt to weed out the duplicate enrolment in transfers from one school to another, or by reënrolment after considerable absences, produced the diminution named in the statistics.*

There is hardly a subject of statistical inquiry in which perplexities do not arise from variable modes of dealing with the given group of facts. For example, take the criminal

*Letter of State Superintendent D. J. Waller, Jr., March 13, 1891, in Census (11th) Report on *Education*, page 6.

statistics. If we take arrests, commitments, fines, or convictions as a basis of comparison we must recognize so many local influences upon the figures as to be confusing, or we must make the figures useless by disregarding the local influences. In arrests, an unfortunate whose bicycle lamp has gone out after sundown may swell the account as much as a murderer, or the boy who threw a ball in the street offset the lad who snatched a woman's purse in the market. The complications arising from the variations of municipal law are so great that some students of criminology are disposed to condemn in wholesale way all comparative tables for the parts of the country as related one to the other. In the *North American Review* for December, 1897, Prof. Caesare Lombroso points out that the variation in definitions of homicide between our States and European countries makes comparisons for homicides in them of low value. Among his authorities he names the United States census. He might further have reminded his readers that the census makes no claim to show the number of crimes of any form in a year or other unit of time, but only to show the number and characteristics of persons held as prisoners on a given day, June 1, 1890, producing a form of record in the summaries of the *Statesman's Year-Book* (1897) most limited of all considerable countries except —

Chili (1894).	In penal establishments, December 31st. . .	5,283
	Condemned, ...	2,162
	Under trial, ...	3,121

The *Year-Book* does not show what may be found in the census report,— that of 82,329 prisoners in the United States over 10 per cent (9737) were waiting trial. This would enable a statement corresponding to that for Chili to be made, but no distinct showing is made of the alleged offences of these 9737. For a double purpose of showing the fuller forms of other countries and the impossibility of determining offences in a year from the prisoners of a day, some countries are cited: —

West Australia, 1895:—	
Offences reported to the police,	9,070
Apprehended or summoned,	8,377
Convicted of petty and serious offences,	5,368
Committed to prison in the year,	1,464
Convicts in the colony, December 31st,	112
Belgium, 1894:—	
Criminals sentenced,	44,908
Mean number of inmates of prisons,	4,413
German Empire, 1894:—	
Cases tried,	1,252,525
Convictions, petty and serious,	446,110
Italy, 1894:—	
Convictions, petty and serious,	370,144
In prisons, all grades, December 31st,	70,939

We can hardly expect to reach a full record of crime, with an annual report like European countries, even if on the model of West Australia, since that fails to reach initial crimes or retributive lynchings not duly reported to the authorities. The day may come when the magistrates of the smallest civil units will report to those of higher units and so on to the highest courts of the States, whence the consolidated reports may be annually brought together with all like reports from federal tribunals, perhaps at the National Department of Justice.

There would be a distinct gain if the official forms in Europe and America could be harmonized in their use of terms where the facts admit uniformity. For example, certain Italian, German, and French reports give age periods in this form: 20 to 25, 25 to 30, 30 to 35; some reports from English speaking countries use this form: 20 to 25, 26 to 30, 31 to 35; other reports from English-speaking countries follow the custom of the continental reports cited, and we in the United States follow one form in certain laws and reports and the other form in some cases.

The changes in material conditions, the new employments of recent dates, make it impracticable to continue all terms in their original force or limitations. It becomes important to approach uniformity of treatment as far as possible. If the merchant jeweler who does no metal work beyond mending a ring or making initials on articles sold is called a manufac-

turer in one set of tables and left out in another,— if in one set of tables the country blacksmith is passed by and in another every plowshare he sharpens, every barn-door hinge he mends, goes into the sum of manufactures, only the relative insignificance of their work leaves any value in the tables for comparative purposes.

A very wide difference in results comes from the diverse interpretations put upon the same facts. Some give the value of manufactures as the value of the articles when put upon the market by the manufacturer; others deduct from this selling value the value of the materials as they came to the manufacturer's hand, crediting to manufactures only the increment of value arising from the new form. The agricultural interest has similar conditions. A large business is done in the corn belt, in fattening sheep and cattle brought from the plains. When a farmer of Iowa or Illinois sells a drove of fat stock in Chicago for $4000, he may have paid $2000 for the same animals in Dakota or Montana subject to additional expense of transportation. It is of consequence whether the farmer with corn is credited with the production of $4000 in food or only with the increment put on the value in a brief period of feeding.

The investigator of property values and the student of taxation are continually brought to face perplexing questions of interpretation. One set of accounts may credit borrowed money to receipts, and charge payment of bonds to expenses; another set in like circumstances will credit receipts only with the premiums on loans, and charge to expense only interest and cost of negotiation. A third set may be found to have followed one course at one time and the opposite course at another. If one attempts to follow closely the discussions regarding municipal ownership of natural monopolies,— gas supply, for example, he will find absolutely opposite conclusions deduced from the same basic facts according to the manner of combining these facts. Some would charge this variation to bad book-keeping, but, no matter by what name the conditions are called, there is a confusion of informa-

tion requiring the utmost care of the impartial student and his sharpest questioning to learn how the figures are combined for balance sheets. In cases of importance it is sometimes necessary to go back of the returns, to borrow a political expression, to determine the proper conclusions. Every one who has paid much attention to municipal accounts can recall instances of transfer from one fund to another, as from the bridge fund to the school fund, or from the school fund to the street fund. A minor transfer of expense liable to fail of entry in the books is still important enough to be sought in nice discussions, as to the profitable or unprofitable management of public water works, for example. Let us suppose a city to have bought 2000 tons of coal, of which 100 tons are charged to the fire department, 100 to the police department, 400 to a pumping station, 1400 to a gas plant. It requires no exaggerated imagination to see that in any emergency which leads one of these interests to borrow from the coal pile of another, the credit to one, and the charge to the other, which pertains to sound private administration, are much more likely to be neglected under a general impression that it is all city coal.

In the late census no inquiry was followed with more skillful care and conscientious fidelity than the investigation regarding farms, homes, and mortgages. An element of uncertainty was recognized where the record showed a large mortgage but where the amount still in force was smaller, with record of reduction to be embodied in a release on a final payment. Stated in a concrete form: A mortgage to secure five notes of $1000 each falling due, annually, in succession, would at first express correctly an indebtedness of $5000; it would continue to represent $5000, as the indebtedness in many an instance, while it really shrunk to $4000, $3000, $2000, and $1000, to be canceled at the last payment.

Let us now turn to questions of wages. How are the wages of teachers in a city that furnishes all books and materials used by its teachers comparable with those in a locality where

the teacher is required to furnish herself with a full set of books used in her grade or to supply the materials used in certain primary exercises by the children? A growing business exists in securing positions for a compensation. How are the net earnings of teachers appointed under such influences to be compared with those of teachers who are not paying fees for their situations? After the investigator knows the general truth in either condition named, how is he to secure facts in detail, reducible to figures?

Many people have difficulty in maintaining comparisons between conditions of unlike degrees of simplicity. The nominal salary attached to an office is a simple element, but many public positions, from the nature of the case, are filled by persons who receive also a greater or less part of living expenses, as house rent, fuel, or board for themselves or families. Other officers must incur cost of keeping a horse, or other outlay, to fulfill the duties of their positions. Boards of local legislators often appear to compare gross salaries in such cases instead of net compensation. The same difficulty affects the house-girl question and other relatively low-priced service. The girl who has $3 a week, with board and lodging, envies the girl with $5 a week or less who must maintain herself, pay 60 cents a week car fare to go to and from a store or office, and in the busy, long dark evenings of the holiday season pay 10 cents a day more car fare for her mother or other protector to see her safely home, besides submitting to dockings and fines for minutes of tardiness or for mishaps and accidents of her situation.

A typical instance of false interpretation may be found in the subject of interior artificial waterways. This subject was treated in the November (1897) *Review of Reviews*. The fundamental facts as to possibilities between Lake Michigan and the Mississippi River have not changed in the seventy-five years since Congress gave the right for a canal to connect these waters by way of the Illinois River. This was followed by a land grant, and a second land grant, and by expenditures in aid of deepening the Illinois River, and by the inaugura-

tion of a canal westward from Hennepin, on the Illinois, to the Mississippi. Congresses have been successfully persuaded that all this was best, but the *Review* writer has another opinion based on a real Chicago drainage canal 26 feet deep, some 30 miles long, a theoretical extension of the same 66 miles long, a consequent deepening of the Illinois River to 14 feet, with a vision of a possible ship canal to the Rocky Mountains; all so grand that he says: "It is almost needless to add that the Hennepin Canal, now under construction, always a bungling and preposterous job, will be rendered wholly useless and must shortly be abandoned." The subject of these waterways bids fair to outlast the youngest of us. The discussions are of deep import to the welfare of the country, to the treasury of the United States, and to the individual tax payer, who must keep the public credit good. We must learn to discriminate between things accomplished, things remotely possible, and, it must be added, things visionary. By courtesy of the Chief of Engineers, U.S.A., I am able to state some actual conditions upon official authority *.

*The Letter explains itself.

Office of the Chief of Engineers,
United States Army,
WASHINGTON, November 30, 1897.

Mr. JAMES H. BLODGETT,
No. 1229 N Street, N. W., Washington, D. C.

Sir: — Receipt is acknowledged of your letter of November 26, 1897, requesting information as to draft of boats when certain improvements now authorized are completed.

At present the government has no plans for deepening of channel between Chicago and the Illinois River. Present communication is by the Illinois and Michigan Canal — a State institution — of small capacity. A drainage canal is in course of construction from the Chicago River westward, but no arrangements have yet been considered by the United States for utilizing this for purposes of navigation. Surveys have been made and plans submitted for connecting Lake Michigan and the Illinois River, but Congress has not taken action in the matter.

The Illinois River is under improvement contemplating a depth at low water of 7 feet. The Illinois and Mississippi Canal, from Hennepin on the Illinois to Rock Island on the Mississippi, will furnish when completed a depth of 7 feet.

The improvement of the Mississippi River, from Rock Island to St. Paul, contemplates a depth of 4½ feet at low water to be eventually increased to 6 feet. The same depths are proposed between Rock Island and the mouth of the Missouri.

Between mouth of the Missouri and St. Louis 6 feet at low water is proposed; between St. Louis and Cairo 8 feet. Below Cairo the improvement of the Mississippi is under the charge of the Mississippi River Commission, whose plans it is understood contemplate minimum depths of from 8 to 10 feet.

By direction of the Chief of Engineers.

Very respectfully, your obedient servant,

A. MACKENZIE,
Lieut.-Col., Corps of Engineers.

The situation on completion of the Chicago drainage canal and all other work thus far authorized would be this: —

A vessel from Buffalo or from Duluth could come into the drainage canal with 20 feet draft and room to spare. From Lockport, 30 miles or so out of Chicago, through the Illinois and Michigan Canal, the Illinois River and the Mississippi River, there would be no more than six feet at low water to St. Louis. From Hennepin westward there would be seven feet to the Mississippi; then up to St. Paul four and one-half feet, ultimately six feet.

With the theoretical extension suggested in the *Review* article the lake vessel of 20 feet draft could reach Lasalle, nearly 100 miles from Chicago; then but 14 feet is promised to the mouth of the Illinois, and other measurements remain as noted already. It must be remembered that the draft for through traffic is fixed by the shallowest place, determined for the lakes by the St. Clair flats and the lock at the head of St. Mary's River. Comparisons with a map in hand will make the situation clearer. Those who have been captivated by the vision of the Chicago drainage canal as a section of a great ship canal can profitably begin computations as to the excavations and the cost to come before a vessel loaded to the full draft of that canal could get beyond its present miles of length.

Such conditions make it important for personal prosperity and the national good that the most rigid care be used in defining terms and explaining limitations in statistical work that is to endure with credit.

The article just cited (*Review of Reviews*, November, 1897) contains a statement, oft repeated, with variations of expression, in the past few years, to the effect that the tonnage passing through the outlet of Lake Superior is greater than that passing through the Suez Canal. Perhaps the latest variation is in *Harper's Magazine* for January, 1898,* where the tonnage (16,239,601 tons) passing through the St. Mary's

* *The New Northwest*, page 307.

Canal (lock) in 1896 is said to be nearly twice that through the Suez Canal in 1895, which, according to the *Statesman's Year-Book*, was 11,833,637 gross tons, apparently two-thirds instead of one-half the St. Mary's tonnage. The statements made by different authorities vary so much in use of terms, as dates, tons, gross tons, net tons, that verification is not easily made. If any one of these statements is right, of what value is mere tonnage in determining commercial consequence? In a single season the tonnage carried over the aqueduct bridge from this district into Virginia was increased several thousand tons. That looks more like an increase of business than when one finds that the great increase of freight and of wagons crossing was due to digging away a hill and carrying the earth and rock excavated for a union transfer station at one end of the bridge to a dump at the other end. Authorities that should be reliable do not fully agree in their figures, but from several authors a table can be made showing various comparisons between these canals: —

	St. Mary's Canal.	Suez Canal.
Cost	$6,000,000 (Old lock, $1,000,000 [1]; new, $5,000,000 [2])	$95,000,000 [1]
Length	Over 1 mile [3]	87 miles [1]; 92 miles [4]
Depth	21 feet [3]	31.2 feet [1]; 26 feet [4]
Av. tonnage of vessels, 1894	856 tons [3]	2,300 tons net [3]
Value of freight, 1894	$143,114,502 [3]	$300,000,000, roughly [3]
Value per ton, 1894	$10.84 [3]	$37.00
Tonnage, 1895	Registered, 16,806,781 [3]	Gross tons, 11,833,637 [5]
Passengers, 1895	31,656 [3]	216,936 [5]
Length of trip, roughly	800 miles	8,000 miles

[1] *Johnson's Cyclopædia*, ed. 1895. [2] *Review of Reviews*, November, 1897. [3] *Statistical Year-Book of Canada*, 1895. [4] *Mulhall's Dictionary of Statistics*, 1892. [5] *Statesman's Year-Book*, 1897.

The tables of the *Statistical Year-Book of Canada* (1895), show an analysis of all freight passing through the St. Mary's lock from its opening. Iron ore, wheat in grain or in flour, made a large part of the east-bound freight, and coal was a

large item in return freight. The Suez Canal bears westward the costly products of the Orient. Not only a variety of items, as in the table, must be considered to make any comparative estimate of the two works, but we must remember that the great ships of the European powers can pass through the Suez Canal, a fact of great import to the welfare of nations.

After all, why these comparisons with the Suez Canal? The question for us is not whether our work is greater or less than some other but whether its utility justifies.

It is impracticable to reach close accuracy on a variety of important subjects, but we can discriminate between statements of some mathematical accuracy and those in which only a very general approach to accuracy can be claimed. The cost of the Suez Canal is given by different authorities from about $70,000,000, presumed to have been expended directly for the canal, to nearly $100,000,000, which, presumably, it cost the promoters after all discounts and charges connected with the project; and the explanations are not always appended. The words "estimated," "probably," and "approximate" often require a place not merely in explanatory text but also when incorporated in titles and tabular headings, where they can stick when exchanges clip the items for republication. When tables that may contain 25 per cent or more of error are sent out with the same certificates of character that are given to those of definite accuracy it must be expected that the whole subject of statistics will receive less respect than it ought to deserve. The word "undoubtedly," with its variations, has done much mischief. If writers would use it only when ready to defend it in its original sense it might recover its standing, but it is now used, to a great extent, to cloak a real ignorance of the exact truth. If the truth is known the word is unnecessary.

A serious fact in connection with the collection and publication of statistics is the general failure to remember that any unit, no matter how insignificant, becomes overwhelm-

ing with a sufficient multiplier. Many an investigator, on his own promptings, has added a question to his circulars, and many a legislative enactment has been swollen in its call for facts, under the feeling that while an investigation is in progress another question will make no difference in cost or trouble. As I have elsewhere stated,* one question that could be answered by yes or no would demand at least one second from each person addressed and another second for combining it with other replies, so that a question effecting each of the population would require the equivalent of 100 enumerators for a month and eight tabulating clerks for a working year. Every time the item enters into a report there must be a corresponding, even if smaller, multiplication of figures, words, lines, or columns.

This affects the cost and the results in a great work like the census in many serious ways. The more questions people, in all parts of the country, persuade their respective representatives to attach to a census, under an impression that it will make no difference, the larger will be the schedules, the more expanded the instructions for the enumerator, till they outgrow his patience or his comprehension. When the returns are gathered, some subjects are so unsatisfactorily reported that all the work upon them is absolutely abandoned, and even that known to be valuable is delayed and burdened with the cost of the mass, till some valuable material fails of publication. Thus in the Tenth Census nearly the entire material on education, the reports on churches and Sunday schools, on marriage and divorce, were lost to the public after the expense of collection. A report of illiteracy by counties, especially for States of great variation in physical or racial conditions, as the mountains and lowlands of Tennessee, or the corresponding race districts of Mississippi, would be very welcome now, but the expenses of the Eleventh Census, swollen by questions that perished, have exhausted

* Report on *Education*, Eleventh Census, page 2.

the appropriations, and the census, like former ones, is closed, not finished.

If the statisticians of the coming generation are to improve upon our work; if the prospective citizens, now in school, are to have an intelligent apprehension of the subjects to require public action, it is highly important that they shall not be misinformed through elementary text-books. There should be close scrutiny of the books used by our children, especially those which deal with matters of information, like readers and geographies. Books bearing the names of high authorities ought to represent the best knowledge of the day, not lie open in matters of fact to criticism by observant children. An elementary book of this year (1897) contains the statements that an Indian rubs two flint stones together and makes a little spark with which he lights his pipe; that a silkworm becomes a butterfly; and that palm-leaf fans grow on cocoanut palms.

The question of governmental aid to transportation projects grows in its financial aspects. With all the importance of accurate knowledge regarding the relation of our interior waterways, a recent geography represents the St. Mary's River, connecting Lake Superior and Lake Huron, as about 60 miles long, composed of rapids, and not navigable, but avoided by a canal, and thus confuses truth and error. Another geography represents the St. Mary's as the largest ship canal in the world without any suggestion of the basis of comparison. Comparison has already been made here with the Suez Canal in several particulars, in most of which the ship canal between the Baltic and the North Sea also surpasses the St. Mary's, whose greatness lies in one stupendous lock,* that seems to have filled the eyes of these writers to the exclusion of all other qualities of size in a canal. Two rival books, apparently using, to an extent, the same base

* According to *Statistical Year-Book of Canada*, 1895, p. 674, it is 800 feet long, 100 wide, has 21 feet of water on the sills, and a lift of 18 feet. By the same *Year-Book*, 1896, the lock lately built on the Canadian side is 900 by 60 feet.

maps, represent the Illinois River as formed by the Fox and the Des Plaines, at Ottawa, instead of by the Kankakee and the Des Plaines farther east. One, in text, gives the four lakes adjacent to Madison, Wis., as the source of Rock River. Various books continue to represent on their maps canals that have ceased to be used for many years. On certain maps the railroads are represented erroneously and inconsistently to a degree that renders them useless for any definite information. One book has this view of agricultural economics: "The wheat belt extends northward nearly to Hudson Bay and southward nearly to the Gulf of Mexico. The limits of the corn belt are somewhat narrower, not because corn will not thrive beyond its present limits, but chiefly because the hog cannot be profitably raised. Beyond these limits corn is valuable only to the extent to which it can be converted into pork and beef." Another tells the children of cotton: "The pods, or balls, containing the seeds, and the fiber around them, are picked by hand and taken to a gin."

These illustrations are not from obscure books selected as literary oddities; they occur in books of current use with superlative indorsements. The maps, the text, and the pictures in the books of our children require our attention if truth is to be taught. Text-books for colleges and universities are likewise sometimes printed with obvious errors, as when a prominent author states that no city ever ceases to be part of a county and pay county taxes, ignoring Baltimore, St. Louis, and the cities of Virginia; and that the Bureau of Engraving and Printing is a bureau of the Treasury that prints all the public documents.

The oral instruction in the schools is generally beyond our reach; but we may be sure that oral lessons, the object lessons of the day, drawn from such authorities as just cited, add to the distortion of fact. The effect upon the child or the student who detects the error, sometimes on the moment, sometimes later, is twofold. It tends to an indiscriminate discredit of authorities. It lowers his estimate of the value

of good work in practical affairs, leading toward reliance on adventitious circumstances for power and success, a condition unfavorable for the rising generation of statisticians.

The individual statistician must scan closely the authority on which he rests, and guard his statements with all the cautionary words which imperfect knowledge requires, or some mere child will point out the errors in his statements and his conclusions and set people wondering of what value the rest of his work may be. The sharp cross-questioning of individual investigation has a tonic effect on men who have not adequately guarded their statements or clearly defined their inquiries heretofore.

So far as any organized effort can be made for the betterment of statistical work this association has a prominent opportunity, for which free discussion and friendly criticism are among the immediately available means.

UNIFORMITY IN CENSUS RETURNS.

At the last meeting of the International Institute of Statistics, held in St. Petersburg, a paper on a World's Census in 1900 was presented by Dr. Joseph de Körösi. In this complaint is made of the lack of uniformity of censuses on certain very important points relating to the population. The author observes that one of the reasons for the establishment of the Congress of Statistics was the securing of uniformity of statistical work published by the bureaus of different countries. In nine of the Congresses thus far held six have considered this question of uniformity. There is still everywhere, however, complaint that the census inquiries, thus far made so enormous and so costly, contain very little as yet which is comparable. Congresses have had some influence in securing uniformity in schedules adopted, but there has not been a sufficient insistence upon the question of abstracting the data furnished by the schedules, according to a uniform system. In many cases, even where the raw material exists alike for all, the results have been worked up according to different schemes. Take for example the question of age. In most countries the results are published for each year of age; but in some age is indicated only by groups, more or less extensive; in some quinquennial, in others decennial. One cannot undertake an international comparison for children of school age, or of youth of military age, or of individuals of the age of procreation, or of individuals of the age of legal responsibility. It is impossible to measure the tendency to crime among different nations, since it is impossible from the censuses at hand to compare the ages. The age is abstracted year by year during the first part of life in France, Greece, Ireland, Netherlands, Scotland, while those of later age are indicated only by quinquennial groups. In England after the 25th year only decennial groups are given. A comparison of the civil state of the population fails. In many states, as, for example, in England, Greece, Ireland, Portugal, Roumania, and Scotland the number of divorced are not given, while Finland groups the divorced with widowers and widows. The statistics of nativity and of political allegiance are not satisfactory for purposes of comparison. In a number of states the nativity by sex is given, as in the German Empire, Bulgaria, Denmark, Scotland,

Ireland, Sweden, and Switzerland, but in other countries there are more or less important variations. Nativity is not asked in Spain, Esthonia, Greece, Livonia, or Portugal; in Finland it is asked only for ten countries. In Belgium, Denmark, and Switzerland all countries are given, but there is no distinction of sex. In England the abstract is made only for countries of the British Empire, while in France, Hungary, Italy, and the Netherlands the question is placed on the census schedule, but the results have not been elaborated.

In the year 1887, at the Congress in Rome, an international schedule was adopted, and it was accepted the same year by the Congress of Demography held at Vienna. The schedule included the following inquiries: —

1. Age for each year.
2. Age in the *city* and in the *country*; quinquennial groups of age for —
   (*a*) The country, that is, districts with less than 2000 inhabitants.
   (*b*) Towns from 2000 to 100,000 inhabitants.
   (*c*) Large cities with more than 100,000 inhabitants.
3. Civil state; not married, married, widowers and widowed, divorced.
4. Civil state according to age; quinquennial groups beginning with the age of 15 for each of the four categories under No. 3.
5. Religion (those having at least 1000 followers).
6. Age by principal religions; decennial groups.
7. Number of those above 15 years of age who cannot read.
8. Number above 15 years of age, according to the principal religions, who cannot read.
9. Nationality (those represented by at least 1000).
10. Age by principal nationalities; decennial groups.
11. Principal nationalities by principal religions.
12. Those above 15 years of age, by principal nationalities, who cannot read.
13. Country of birth.
14. Political allegiance.

The following table shows the results of recent European censuses on the first five of the points suggested: —

Yes = Results comparable; No = Not comparable.

Year of Census.	1. Age by year.	2. Age in cities and country; quinquennial groups for— *a*. Country districts below 2000. *b*. Cities, 2000–100,000. *c*. Cities, over 100,000.
1. GERMANY. 1890. Dec. 1.	Yes.[1]	No. Age: —15, —40, —60, 60—. Cities classified as: 5000–20,000, —100,000, 100,000— inhabitants.
Alsace-Loraine. 1890. Dec. 1.	Yes.	Yes. Cities: —2000, —5000, —20,000, —100,000, 100,000—.
Anhalt. 1890. Dec. 1.	Yes.	No.
Baden. 1890. Dec. 1.	Yes.	No. Decennial groups for districts below 2000 and 2000–20,000, quinquennial groups for cities over 20,000.
Bavaria. 1890. Dec. 1.	Yes.	No. Classified only as cities and country.
Brunswick. 1890. Dec. 1.	No.[2] 0–15, each year, —18, —20, then by groups.	No. (Other age groupings.)
Bremen. 1890. Dec. 1.	No.[2] 0–1, 1–5, then by groups to 40, —40–50, —60, —65, —70, —80, 80.	Not on schedule.
Hamburg. 1890. Dec. 1.	Yes.	Not on schedule.
Hesse. 1890. Dec. 1.	Yes.	Yes.
Lubeck. 1895. Dec. 2.	Yes.	Not on schedule.
Mecklenburg-Schwerin. 1890. Dec. 1.	Yes.	Not abstracted.
Oldenburg. 1890. Dec. 1.	Yes.	No. Without sex.
Prussia. 1890. Dec. 1.	Yes.	No. Special classification for cities above 5000. Ages: —15, —40, —60, 60—.

[1] In all of the States of the German Empire age is taken not by "years of age" but according to "year of birth". As the census is taken on December 1 the difference is appreciable, since the first year comprises only 11 months instead of 12. The returns, however, are indicated as comparable with the international schedule, although it is not strictly true.

[2] Comparable in the census of the German Empire.

3. Civil state. Not married, married, widowers or widows, divorced.	4. Civil state according to age; quinquennial groups beginning with 15 years for each of four classes.	5. Religion. (Sects having at least 1000 followers.)
Yes.	Yes. —15, —18, —20, —21, 25 and upwards by quinquennial groups.	No. 18 sects, but no distinction as to sex.
Yes.	Yes. Each year.	Yes.
Yes.	Yes.	Yes. 18 sects.
Yes.	Yes. Each year.	No. Only 4 sects.
Yes.	Yes. Each year.	No. Without sex.
Yes.	No.[2]	No. Only principal sects and without sex.
No. Divorced not classed.	No. See previous column. Age 20-40 by quinquennial groups, 40–50, 50–65, 65—	No. 6 sects without sex.
Yes.	Yes. Each year.	Yes. 14 sects.
Yes.	Yes.	Yes.
Yes.	Yes. Each year.	Yes.
Yes.	Yes. Each year.	Yes.
Yes.	Yes.	Yes. 7 sects.
Yes.	Yes.	Yes. 17 sects.

Year of Census.	1. Age by year.	2. Age in cities and country; quinquennial groups for— *a.* Country districts below 2000. *b.* Cities, 2000–100,000. *c.* Cities, over 100,000.
Saxony. 1890. Dec. 1.	No.[2] Quinquennial groups.	Not abstracted.
Saxe-Meiningen. 1895. Dec. 2.	Yes.	Yes.
Thuringian[3] States. 1890. Dec. 2.	Yes.	No. Only for cities above 10,000.
Würtemberg. 1890. Dec. 1.	Yes.	No. Only percentages. Different classification, without sex.
2. AUSTRIA. 1890. Dec. 21.	Yes.	No. Decennial groups. Population: —500, —2000, —5000, —20,000, 20,000.
Bosnia-Herzegovina. 1895. April 22.	Year by year, but only for males.[4]	Not abstracted.
3. BELGIUM. 1890. Dec. 31.	Yes.	No. Age year by year. Population; —5000, —10,000, 10,000—.
4. BULGARIA. 1893. Jan. 1	Yes.	Not abstracted.
5. DENMARK. 1890. Feb. 1.	Yes.	No. Classification only between cities and country.
6. SPAIN. 1887. Dec. 31.	Yes.	Not abstracted.
7. FRANCE. 1891. April 12.	No. Each year, 0–24, then giving groups.	No. Age: 0–1, —19, —39, —59, —60, 60— Population: —5000, 10,000–20,000, —30,000–100,000, 100,000—.
8. GREAT BRITAIN. England. 1891. April 6.	No. Quinquennial groups to 25, then decennial.	Not abstracted.
Scotland. 1891. April 5.	No. (See England.)	No. Age, —15, —20, —40, —60, 60— for cities, more than 10,000.

[3] Thuringian States: Saxe-Weimar, Saxe-Altenburg, Schwarzburg-Sondershausen, Schwarzburg-Rudolstadt, Reuss Aelterer Linie, Reuss Jungerer Linie.

[4] Out of regard to the Mohammedan population age is asked only of males in Bosnia-Herzegovina.

3. Civil state. Not married, married, widowers or widows, divorced.	4. Civil state according to age; quinquennial groups beginning with 15 years for each of four classes.	5. Religion. (Sects having at least 1000 followers.)
Yes.	Yes.	Not abstracted.
Yes.	Yes. Each year.	Yes.
Yes.	Yes. Each year.	Yes. 12 sects.
Yes.	Yes. Each year.	No. 20 sects without sex.
Yes.	Yes.	Yes. 17 sects.
Not abstracted.	Not abstracted for men.[4] Not on schedule for women.	No. Without sex.
Yes.	Yes. Each year.	Not on schedule.
Yes.	Not abstracted.	Yes. 6 sects.
Yes.	Yes.	Yes. 14 sects.
No. Divorced not given.	Not abstracted.	Yes. 5 sects.
Yes.	Yes. (See column 1.)	Not on schedule.
No. Divorced not given.	No. (See columns 1 and 3.)	Not on schedule.
No. (See England.)	No. Age comparable, but lack divorced.	Not on schedule.

Year of Census.	1. Age by year.	2. Ages in cities and country; quinquennial groups for — *a*. Country districts below 2000. *b*. Cities, 2000–100,000. *c*. Cities, over 100,000.
Ireland. 1891. April. 5.	No. Each year to 20, then quinquennial groups.	No. Only for cities of more than 2000.
9. GREECE. 1879. July 21.	No. Each year to 30, then quinquennial groups.	Not abstracted.
10. HUNGARY. 1890. Dec. 31.	Yes.	Not abstracted.
11. ITALY. 1881. Dec. 31.	No. Each year 0–10, —10–12, —15, then quinquennial groups.	No. Only principal towns and country specified.
12. NORWAY. 1891. Jan. 1.	Yes.	No. Classification between cities and country.
13. NETHERLANDS. 1889. Dec. 31.	Yes.	No. Each year, but only for cities above 20,000.
14. PORTUGAL. 1890. Dec. 1.	Not abstracted.	Not abstracted.
15. ROUMANIA.	No. 0–1, —5, then quinquennial groups to 60, then decennial.	Not abstracted.
16. RUSSIA. Esthonia. 1881. Dec. 29.	Yes.	Not abstracted.
Finland. 1890. Dec. 31.	Yes.	No. Only cities and country.
Livonia. 1881. Dec. 29.	Yes.	Not abstracted.
17. SERVIA. 1890. Dec. 31.	No. 0–30, each year, then quinquennial groups.	No. Only cities and country.
18. SWEDEN. 1891. Dec. 31.	Yes.	No. Only for cities below 10,000, —100,000, — and above 100,000.
19. SWITZERLAND. 1888. Dec. 1.	Yes.	No. Only for cities above 10,000.

[5] Divorced not given, as law does not permit divorce.

[6] An attempt was made to state the number of Protestants and Jews in an inquiry of the pastors and rabbis. (Vide *Annali di Statistica*, 3 Serie, No. 7–8, 1883.)

3. Civil state. Not married, married, widowers, or widows, divorced.	4. Civil state according to age; quinquennial group beginning with 15 years for each of four classes.	5. Religion. (Sects having at least 1000 followers.)
No. (See England.)	No. (See Scotland.)	Yes. 297 sects.
No. Divorced not given.	Not abstracted.	No. Only 3 groups.
Yes.	No. Quinquennial groups, 15–30, decennial, 30–60, above 60.	Yes. 9 sects.
Yes.[5]	Yes.[5]	Not abstracted.[6]
Yes.	Yes. Each year.	Yes.[7]
Yes.	Yes. Each year.	Yes. 28 sects.
No. Divorced not given.	Not abstracted.	Not on schedule.
No. Divorced not given.	Not abstracted.	No. 7 sects, but without sex.
Yes.	Yes.	Yes.
No. Widows, widowers, and divorced in the same category.	No. Each year, but see column 3.	Yes. 3 sects.
Yes.	Yes.	Yes.
Yes.	No. Age, below and above 15.	Yes. 7 sects.
Yes.	Yes.	Yes.[8]
Yes.	Yes. Each year.	No. Only 3 sects, but without sex.

[7] Statistics of religions in Norway now in press.

[8] Statistics of religions in Sweden published in Part (*d*) *Bidrag till Sveriges Officiele Statistik*, xxxv, 2, Table 6.

The results for the remaining inquiries can be more briefly presented.

No. 6. Age by principal religions; decennial groups.

Only in Livonia, Sweden, and Denmark are the results comparable, and in the latter the data are for each year of age. In Belgium, France, England, Scotland, Italy, and Portugal the question was not placed upon the schedule. In the other countries the data were not abstracted.

No. 7. Number of those above 15 years of age who cannot read.

In Bosnia-Herzegovina and Belgium the results are comparable for each year of age; in Ireland for each year between 20 and 24, then by quinquennial groups; in Esthonia and Livonia for age above 14; and in Hungary and Italy they are comparable according to the international schedule. In Austria the results are not comparable,— the ages being given from 6 to 10 for each year, and then by decennial groups; in Bulgaria they are given for the whole population above 6 years of age; in Spain, Greece, Portugal, Roumania, and Servia they are given only for the total population; and in Finland for the population above the age of 10. In the other countries the inquiry was not placed upon the schedule.

No. 8. Cannot read, above 15 years of age, by principal religions.

In Austria, Bosnia-Herzegovina, Bulgaria, Spain, Greece, Roumania, Esthonia, Finland, Livonia, and Servia the data were not abstracted from the census schedules. In Ireland the results are not comparable as they are indicated for the population above 5 years of age. In Hungary the results are not comparable as they are given only for the total population. In all the other countries the question was not placed upon the schedule.

No. 9. Nationality.

Results are comparable in Prussia, Esthonia, Livonia, and in Austria (for 9 nationalities according to the language spoken); in Bulgaria (for 15 maternal tongues); in Hungary (for 12 maternal tongues); in Finland (for 4 according to language spoken); in Servia (22 nationalities according to language spoken); and Sweden (3). They are not comparable in Belgium (only 3 spoken languages); in Roumania (7 nationalities without sex); and in Switzerland (5 nationalities according to maternal tongue, but without sex). In all the other countries the question was not placed upon the schedule.

No. 10. Age by principal nationalities; decennial groups.

The results were not abstracted for Belgium, Bulgaria, Roumania, Finland, Servia, or Switzerland. They are comparable in Prussia, Austria (up to 70 years); Hungary (up to 60 years); and Sweden (by quinqennial periods). They are not comparable in Esthonia and Livonia (decennial groups up to 30 years, then by groups of 20 years). In the other countries the question was not placed upon the schedule.

No. 11. Principal nationalities by principal religions.

The results were not abstracted in Austria, Bulgaria, Roumania, Finland, Livonia, Servia, or Switzerland. The results are comparable for Prussia, Hungary, Esthonia, and Sweden. In the other countries the question was not placed upon the schedule.

No. 12. Cannot read, above 15 years of age, by principal nationalities.

The results were not abstracted in Austria, Belgium, Bulgaria, Roumania, or Servia. They are comparable in Esthonia and Livonia (for age above 14 years). They are not comparable in Hungary (only for the total population), and in Finland (for the ages above 10).

No. 13. Country of birth.

The results were not abstracted in Bavaria, Brunswick, Bremen, Bosnia-Herzegovnia, Italy, or Netherlands. They are not comparable in Oldenburg (classified only in European countries); in Belgium (only 10 countries and in part without distinction of sex); Denmark (without sex); Spain and France (foreign countries not specified); England (specified only for British possessions); Hungary (omits specification of foreign countries); Finland (only 10 countries mentioned); Switzerland (38 countries without sex). In other countries the results are comparable.

No. 14. Political allegiance.

The results were not abstracted in Mechlenburg-Schwerin. They are not comparable in Bavaria (without sex); Brunswick (omits specification of German States); Bremen (only 5 countries, without sex); Bosnia-Herzegovina (specifies only Austria-Hungary); Belgium (only 10 countries and in part without sex); Spain (only six countries); Greece (only 13 countries and without sex); Netherlands (6 groups of States); and Switzerland (37 countries but without sex). In Denmark, Great Britain and Ireland, Norway, Portugal, Roumania, Finland, and Sweden the question was not placed upon the schedules. In other countries the results are comparable.

COST OF PRODUCTION OF CORN AND OATS IN ILLINOIS IN 1896.

Bulletin No. 50 of the State of Illinois Agricultural Experiment Station (February, 1898) contains an account of an investigation of the cost of production of corn and oats in Illinois in 1896, made by Mr. Nathan A. Weston. It is impracticable to reproduce the statistical data in detail, but the novel character of this investigation justifies a reproduction of the larger portion of the text. Prof. David Kinley in an introductory note states that: —

> The limits of the scope of the inquiry should be emphasized. The results presented concern the corn and oats' products of Illinois in the season of 1896 *only*. The figures of cost in one year cannot be used for any other; for, of course, the cost varies with the yield and the season. A given total of expenditure in a season when the yield of corn was 40 bushels to the acre would give a different cost per unit of measure from what it would give when the yield was 60 bushels. This fact shows the fallacy of the tables of some of the Illinois crop reports, which copy for a series of years the figures of cost obtained only in the first of the series.
>
> It is not thought necessary to enter here into a discussion of the theoretical question of what constitutes cost of production. The matter of practical interest is to determine what has been the total outlay made by the farmer in order to place on the market a bushel of the cereal in question. That outlay comprises rent, labor, expenditure for seed, and, perhaps, fertilizer, interest, and taxes on tools and other farm equipment, and also depreciation of the same. Taxes on the land need not be included because they ordinarily fall on the land-owner as such. Rent should not be excluded, as it sometimes is, on the mistaken application of the economic theory that "rent is not an element of cost." This doctrine does not mean that "a tenant farmer need not take his rent into account when making up his year's balance sheet. When he is doing that he must count his rent just in the same way as he does any other expense."
>
> While Mr. Weston's investigation was under way we heard that the *Orange Judd Farmer* was making a similar inquiry, extending it, however, to eight states. The statistician of the journal kindly sent us his data for Illinois — a dozen or fifteen replies in all, I think — for our use. It seemed inadvisable to use these on account of differences in the form of inquiry. The results of the investigation of the *Orange Judd Farmer* have since been published, and the conclusion drawn from them that corn was grown in the season in question at a cost per bushel as low as 6 cents. That is much below the cost arrived at in this bulletin. If we omit rent

the cost per bushel through husking would, according to this inquiry, be about 8 cents.

It should be noted that the corn crop of 1896 was above the average, and that the average yield per acre on the farms reported in the following statistics is 54 bushels.

No addition is made herein for taxes. As said already, in our opinion taxes on equipment only should be counted in, and our data on these were too meagre and uncertain for use. In any event the amount to be added therefor to the cost would probably not exceed 6 or 7 cents per acre, or a little over 1 mill per bushel.

It would be very desirable if a properly conducted inquiry into the cost of production of the leading cereals could be made for a series of years. If undertaken under the direction of competent statisticians some light might be thrown on the vexed question of "the distress of the agricultural classes."

The inquiry of Mr. Weston is as follows: —

Considerable has been said and written about the cost of producing the leading cereals, but only a few really systematic inquiries into the question have been made. These have usually been based upon the estimates of interested correspondents, and not upon the reports of work actually done by those engaged in production. Such reports, while interesting, are, however, of but little scientific value because it is impossible to tell how far they are mere guesses.

In view of the great fall in the prices of farm products, and the widespread and prolonged agricultural depression of recent years, the question of cost of production of agricultural products is of great interest and practical importance. The question as to what crops are most profitable, is, of course, the leading one with producers. It cannot be denied that farmers in some sections of the country, being insufficiently acquainted with the problem of cost of production, and not knowing the exact state of the world's supply, have persisted in growing certain kinds of grain when something else could have been produced with much greater profit.

The present investigation was begun in order to secure, if possible, accurate information on the expense of raising the corn and oats' crops of 1896 in the state of Illinois. Before giving the details of the inquiry, it will be interesting to review briefly some previous attempts to determine the cost of production of these grains. Hardly worthy of mention are numerous statements of individual accounts and experiments relating to the subject, to be found in the agricultural

reports of the various states and the United States, running in time throughout the past thirty years.

In 1885, 1886, and 1887 inquiries concerning the cost of producing corn and oats in Illinois were made by the state department of agriculture.* The published results consist simply of a series of tables, without detailed description or analysis. The tables show returns for all the counties of the State, indicate the acreage as returned by the assessors, the yield per acre in bushels, the total yield in bushels, the price per pushel, the value of crop, the cost of production per acre, the total cost of production, and the profit, or loss, on the crop. The data as to cost, from which the tables were compiled, consisted chiefly of estimates by correspondents of the department. There is nothing to show that any separate account was taken of the individual elements which enter into cost of production; and, in fact, there is nothing to show that the cost of production per acre for the counties is anything other than an estimate. The purpose of the inquiry appears to be to show the relation between the value of the crop and the cost of its production. This is done without any apparent consciousness of the fact that in such an account the item of cost of production is of prime importance. The cost of production per acre in the series of tables given in the reports of 1886 and 1887 is practically the same. The few variations that occur are so slight as to be unworthy of notice. It is significant that the Crop Reports give the same figures for cost of production, for every county, year after year.

The next investigation of a similar nature was undertaken by the United States Department of Agriculture in 1893. It was prompted by numerous inquiries relative to the cost of raising our principal cereals. Corn and wheat were chosen as the subjects of inquiry. In the case of corn the items of cost were enumerated as follows: Rent of land, manure, preparing ground, planting, cultivating, gathering, housing, and marketing. The table as compiled shows the average and total cost under each of these items, for individual states, groups of states, and the country as a whole. The results were derived from individual estimates made by over 28,000 practical farmers. These results were checked by replies received from over 4000 experts, who were graduates of various agricultural colleges and engaged in farming.

* *Crop Reports, Ill. State Board of Agriculture*, 1886, 1887.

Further work of this kind has been done by the Illinois Department of Agriculture during the present year, and the results were published in the *Statistical Report of the Illinois State Board of Agriculture* for May. Like previous reports by this department, this is made up entirely of a series of tables, without discussion or analysis thereof, or any explanation of the method of their construction. In fact, the subject is barely mentioned in the beginning of the report where it is stated that, "It is impossible to obtain the exact cost of production, but the tables are prepared from the accounts and estimates of practical farmers, which have been carefully examined, compared and revised before presenting them to the public in this form." It would have added much to the interest and usefulness of the effort if a more detailed account of it had been published. However, the tables show that they have been prepared with some care. A careful discrimination has been made between the different elements which enter into the expense of production. This is an important feature which former investigations of the Department have omitted.

The Present Inquiry.

When the initiatory steps of the present inquiry were taken nothing was known of the work already begun by the Illinois Department of Agriculture. In preparing the circulars to be sent to the farmers of the State an attempt was made to avoid the weaknesses and supply the deficiencies of the earlier efforts of this kind. It was the aim to reach, so far as possible, the working farmers of the State as a class. No discrimination was made in favor of those who are recognized as experts, or profess some special interest in these inquiries. It was deemed that much more trustworthy results would be obtained by seeking information from the farmers in general, because the average conditions in practical farming are more likely to be reached in this way than in any other. In the main, the questions were so arranged in the circular as to follow the order of work in production. The questions do not call for estimates, but for actual expenditures. The questions were made as few as possible, and of such a character that they could be answered easily. Wherever possible, expenditures were asked for in terms of days' labor. The rate of wages per man, and per man and team, was then asked for in order to be applied to the number of days spent in labor. The purpose of putting the in-

quiry into this form was to remove the temptation to make estimates, — a temptation to which one yields more easily when giving answers to such questions in dollars and cents.

There is another advantage of much importance secured by asking for replies in terms of days' of labor rather than of dollars. The men of the family of the farmers doubtless work many days without remuneration in wages such as is accorded hired help. If answers had been requested in terms of dollars some correspondents would doubtless have omitted the cost of that family labor. As the circular was worded, we probably secured a pretty complete return of this labor. Some of the questions proposed have no direct bearing on the cost of production. They were inserted for other purposes. Following is a form of the circular sent out: —

UNIVERSITY OF ILLINOIS,
URBANA AND CHAMPAIGN,

JANUARY 30, 1897.

The University of Illinois is endeavoring to secure accurate information concerning the cost to the farmer of producing corn and oats. Your co-operation is asked in the work. You will confer a great favor by answering the following questions, which refer to the crop of 1896, no matter whether your conditions for that year were favorable or not.

Information of this kind will throw light on our agricultural question, and none can give it better than the farmers themselves. Of course all answers will be treated as confidential.

Name of Township

(A) CORN.

How many acres grown?

How many days labor actually used in: — (*a*) Breaking stalks? (*b*) Plowing? (*c*) Disking? (*d*) Harrowing? (*e*) Rolling? (*f*) Planting? (*g*) Cultivating? (*h*) Cutting? (*i*) Husking? (*j*) Hauling to market?

What was the cost (in dollars) of shelling?

Was it grown on sod or other land?

Was it planted by hand or check-rower?

Was it cut or husked from the hill?

How many times was it cultivated?

What was the total yield in bushels?

If husked by machine: — (*a*) What was the cost (in dollars) per acre? (*b*) Did the fodder keep? (*c*) How did it compare with timothy hay for feed? (*d*) How much was baled for market? (*e*) What was the price per ton?

(B) OATS.

How many acres grown?

Was it grown on corn or other land?

How many days labor actually used in: — (*a*) Breaking stalks? (*b*) Plowing? (*c*) Disking? (*d*) Harrowing? (*e*) Rolling? (*f*) Sowing? (*g*) Cutting and shocking? (*h*) Hauling and threshing? (*i*) Hauling to market?

What was the cost (in dollars) of twine used?

What was the total yield in bushels?

(C) What was the rate of wages per man?

What was the rate of wages per man and team?

What was the rent of land per acre?

What is the distance to market?

Name .....

Eight hundred of the above forms were sent out in February, and about one hundred more at later times to some of the counties which previously made no replies. When the returns began to come in they showed at once that some important points had been overlooked in preparing the questions, while some of the questions prepared were so worded as in some cases to give rise to vague answers. In order to secure some additional information and remedy the difficulties that developed, the following form was sent to 100 of those who had made replies: —

1. Number of horses used in: — (*a*) Plowing? (*b*) Disking? (*c*) Harrowing?
2. Cutting and shocking oats: — (*a*) Number of days? (*b*) Number of men? (*c*) Number of horses?
3. Hauling and threshing oats: — (*a*) Number of days? (*b*) Number of men? (*c*) Number of horses?
4. Cost of seed: — (*a*) Corn? (*b*) Oats?

Name .....

Township .....

County .....

Of the 900 of the original circulars distributed, 316 were returned with answers, and of the second form nearly all. Considering the nature of the inquiry and the fact that the circulars were sent to all classes of producers in every part of the State, this is held to be a very excellent showing. About 15 per cent of the replies were accompanied by letters in explanation of some parts. Many useful suggestions were contained in these, and some information was gained that could not well have been obtained in answers to questions.

When the replies were examined some counties were proved to be largely represented, while others were not represented at all. In sending out the circulars an effort was made, as has been said, to distribute them as equally as possible over the territory of the State. The fact, then, that some counties show no returns is to be attributed largely to the agricultural conditions which prevail. An inspection of the tables will show that these counties are mainly in the southern group, where, generally speaking, corn and oats are not the staple products. Furthermore, a study of the Crop Reports of Illinois in recent years, and of the United States census reports for 1890, with respect to the acreage and production of corn and oats in the counties of Illinois, shows that those counties from which the largest number of replies came to our inquiry are the ones in which these grains are most largely grown.

An analysis of the returns reveals the fact that while there is great uniformity in the answers to some of the questions asked, in the answers to others there is considerable variation. This was to be expected, since in different localities the elements which enter into cost of production are necessarily different. This fact indicated the method for compiling the data. It was determined to take account of the constant elements first, to compute the expense of production up to the point where differences appeared in the character of the constituent elements of expenses of production, and then to make whatever additions were necessary to include the variable factors. An examination of the replies showed that, with the exception of cutting, shelling, and hauling to market, the elements comprising the expenses of production were very uniform in character. It was decided, therefore, to find the expense of production first excluding these three elements, and then to add the necessary amounts for these items separately.

Of the 316 replies 274 were used in constructing the tables on corn. The others either failed to give reports on corn, were incomplete, or for some reason was deemed unreliable. It was not thought necessary to insert the individual replies. Accordingly Table 1 shows the returns by counties. The elements of expense of production as far as and including husking are labor, rent of land, and seed. The sum of these three was found for each individual reply, and the sum of these sums gave the total of the county. This divided by the total number

of acres or bushels represented in the replies, gave the expense per acre and per bushel, respectively. The average additional expense per acre and per bushel due to the three variable elements was then determined separately for each county and added to the average previously found. The result was the total cost per acre and per bushel for the county, so far as determined by the elements taken into account.

The number of replies which gave expense for seed was 59. These were used to obtain the average for the State. As calculated from table 6 it is .065 per acre, or .455 per bushel planted. The average amount of seed to the acre was estimated at one-seventh of a bushel.

Frequently some of the items, as the rate of wages or the rent of land, were omitted in the replies. Their places were filled by taking an average of the returns obtained from the same county. Throughout the investigation the rate of wages per man and team, when it was not given, is estimated at double the rate of wages per man. The rent of land was not always given in dollars, but occasionally as some fractional part of the crop. A proportionate amount was then subtracted from the number of acres and bushels returned, and the total expense, excluding rent, divided by the remainder, giving the expense per acre and per bushel. For instance, in one reply the rent of land is given as one-half of the crop, the number of acres 60, the number of bushels 3000, and the cost, exclusive of rent, $259.90. Dividing this cost by one-half the number of acres and bushels we have $8.66 and $.173 for the cost per acre and per bushel, respectively. On account of this irregularity, the average rent per acre for the counties multiplied by the number of acres reported will not always give the total rent for the counties. The average rent per acre for the counties is the average of the returns which were given in *money*.

Of the 316 replies received to the questions only 170 were available in compiling the tables concerning oats. A larger number failed to report on oats than on corn, and a great many were so confused on some points that their answers were evidently unreliable. In computing the average cost here the same method was pursued as before. The expense of production was first found so far as the uniform elements were concerned, and additions made to the county averages for the variable factors. Only one variable element, how-

ever, appears in the case of oats, that of hauling to market. With one exception, the same irregularities occur in the individual returns as in those on corn, and the same points are to be noted regarding them. The exception consists in an estimate made in some of the returns with respect to the days of labor spent in cutting and shocking, and hauling and threshing. There were many replies in which the number of men and teams used in cutting, shocking, hauling, and threshing was not given, although the time taken to perform these operations was given. In order to supply this omission and render usable many replies which were otherwise excellent, the average number of men and of men and teams used in these two kinds of labor was determined from those replies in which definite answers were given. These averages were then applied in all those cases where some definite time was given for performing the work. The cost of seed was computed in the same manner as in the case of corn, and is 50 cents per acre, or 20 cents per bushel. The average amount of seed to the acre was estimated at two and one-half bushels.

General Considerations Affecting the Statistics.

Before analysing our results and comparing them with those of former investigations it will be necessary to take notice of some factors in cost of production that do not appear in the circular, as well as of some things produced which are not accounted for in the number of bushels of grain reported.

First, there is the annual interest on the capital invested in machinery, horses, etc., together with the depreciation of the same, which are necessarily parts of cost. This interest is not to be added to the cost of each crop, but is to be distributed among all the crops of the farm in proportion to the amounts of time during which the fixed capital was used in the production of the respective crops. It is difficult to determine the amount to be placed to the account of each.

In the second place, there is sometimes considerable capital invested in fertilizers. This is not all to be added to the cost of the first crop which is grown after the treatment of the soil, as is commonly done, but, rather, it should be distributed over successive crops as long as its beneficial effects endure. How this apportionment should be made is also difficult to determine.

Further, it is not contended that the labor processes taken account of in the circular constitute all the labor that enters into production. There are many days' work done about a farm, as in the destruction of noxious weeds, the repairing of fences, etc., in order to keep it in the best conditions for production, which must be made a part of the cost of all crops affected thereby.

Finally, in the case of oats the cost of the use of the threshing machine and that of coal are to be added to the average expense as determined in the tables.

On the other hand, the fact must be kept constantly in view that the labor and capital invested have produced some values in addition to the number of bushels of grain. In the case of corn there are the stalks, or fodder, usually worth something, and frequently considerable. In the case of oats there is the straw, which always has a value. Frequently other things are grown with both corn and oats with little or no additional labor. For instance, clover is commonly sown with oats and used for pasturage after the oats are harvested, or plowed under for a fertilizer. It is particularly to be emphasized that, when any attempt is made to determine the *profits* arising from the production of a crop, the value of these complimentary products must be taken into consideration.

Analysis of the Tables — Corn.

Table 1 presents the returns for corn by counties. It shows that of a total of 102 counties 76 are represented in the replies. This is 74.5 per cent. A careful examination of the counties from which replies were most numerous shows that the "corn counties" are very well represented. It is probable, therefore, that the averages need no correction for unequal distribution of replies. The total number of acres represented by the replies is 16,603. The corn acreage of the State in 1896 was 6,881,400. The total number of bushels represented is 896,235. The total crop for that year was 288,616,334. As has been said, the cost of production as far as, and including, husking was first worked out, for the reason that the other items of cost did not appear in all of the replies. Taking the figures as they stand, it appears that the lowest cost per bushel is in Edgar county, 11.3 cents; the highest in Edwards county, 38.8 cents. The average for the State is $8.72 per acre and 16.1 cents per bushel.

In addition to the expenses of production thus far discussed there are certain other items which, as has been said elsewhere, should fairly be included. Something needs to be added for depreciation of equipment and for interest on investment in equipment; something more for the cost of keeping teams when idle through the winter, and also something for wages of the men when the weather is so bad that they cannot work. It is difficult to estimate these items, but we may perhaps get at the matter in some such way as this: —

The cost of equipment will perhaps average about $250.00* for every 40 acres. If we allow 10† per cent for deterioration and 6 per cent interest, it will be necessary to add about 1.8 of a cent per bushel to the cost of the crop of the year that we are considering. Per acre the amount will be $1.00. If we allow 5 per cent of time lost we must add also, to get our total cost, 4 mills‡ per bushel, and 21 cents per acre. Allow $15.00 as the cost of keeping a team 5 months on the basis of $1.50 per month per horse for pasturage. One-half of this, $7.50, may be placed against oats and corn when they are the leading crops. If we allow one team for every 40 acres we must add 1.7 mills per bushel and 9 cents per acre for this item.

Finally, something should be allowed for the cost of cribs. The original cost of these is about 2 cents per bushel capacity, and a crib will ordinarily last about 12 years. We must therefore add for this item about one-sixth of a cent per bushel to our cost. This gives us, per bushel, 18.6 cents, and, per acre, $10.10.

As against the items of a general character on account of which we have added to the cost as shown in the table, there are certain other items that must be regarded as lessening the cost obtained. In the first place, during the period of growth of the crop both men and teams are likely to spend considerable time in other work than that involved in the original crop. How much should be allowed for this

* Team, wagon, and harness, $170.00; plow, $12.00; harrow, $11.00; planter, $40.00; cultivator, $18.00; disk, $28.00; roller, $20.00. Total, $299.00. If we assume that one harrow, planter, disk, and roller will do for 80 acres, we must deduct half the price of each, leaving $250.00. If stalks be cut by machine, $21.00 or half the price of cutter should be added to make equipment complete.

† It is not meant that the equipment needs replacing only once in ten years, but that so far as depreciation is caused by use in *corn* raising ten per cent per annum is a fair allowance.

‡ Total days labor man and team, through husking ÷ No. bushels × .05 × average wages of men and team. $\left.\begin{matrix}\\ \\ \end{matrix}\right\} = \frac{37079}{896235} \times .05 \times \$2.13 = .004$

it is impossible to say. Perhaps, however, it would offset the amount added on account of idleness during bad weather. Of more importance than this is the value of the by-products. The principal one is the stalks, which often serve as fodder. The value of this fodder must, of course, be deducted from the gross cost already figured out. We may estimate it at 1 cent per bushel,* or 54 per acre. Making these deductions we get 17.3 cents per bushel and $9.35 per acre. If the reports recently made public concerning the availability of the pith of corn-stalks for use as cellulose in naval and other construction are borne out, the value of the corn-stalk as a by-product will be greatly increased.

How much, now, must we allow for what we have called the non-uniform elements of cost of production, namely, shelling, hauling to market, and cutting?

It is a question whether the cost of any of these operations should be included in the expense of producing corn. They certainly are not to be included in those cases where the corn is fed in the ear to hogs or stock. Cutting, at least, as has been said, is not properly counted an item of cost at all, especially since, in most cases, breaking and plowing in the stalks have already been allowed for. Moreover, the cost of cutting would doubtless be more than offset by the value of the stalks for fodder. Hence the cost of cutting need not be included, although it is of interest to determine how much it is. The total number of acres cut was 1510, and their yield was 79,826 bushels. The number of days' labor required was 1059. At the average wages of $1.06 per day, we get 74 cents per acre, and .014 cent per bushel, as the average cost. The amount of stalks which supply on the average one bushel of grain took .013 of a day to cut.

Turning, now, to shelling and hauling, a true, mathematical, average cost of production for the whole crop would perhaps require us to determine the average cost of each of these processes for the quantity to which each of them was actually applied, and then to add to the average cost of the whole crop, through husking, such proportions of the cost obtained for shelling and hauling as the amounts shelled and hauled bear to the whole. Such an average, however, would be ideal. It would have no actual cost to correspond to it, and so would be of no interest. The practical question is: What

*The figure of the *Orange Judd Farmer*.

does it cost on the average, per bushel and per acre, to raise corn and deliver it at the elevator? Accordingly, we add to the total cost thus far obtained the average cost of shelling and of hauling as calculated from the figures obtained from those who reported shelling and hauling. Of the whole amount of corn reported 312,426 bushels were shelled from 5638 acres. The total cost of shelling was $2,935.93, or 9 mills per bushel and 52 cents per acre. The range of cost of shelling per bushel was from a quarter of a cent to two cents. Each of these prices applied to only a single report. The great majority of replies were pretty close to the average.

The number of bushels hauled to market, shelled and unshelled, was 311,345 from 5561 acres, and the hauling took 1922 days' labor of one man and team. At $2.13 per day this amounted to $4093.86, or .013 cent per bushel, and .73 cents per acre. The average distance was 3.2 miles, and the average load 162 bushels. Hence the cost of hauling one bushel one mile was 4 mills. Adding these items we get a final cost per bushel of 19.5 cents, and per acre of $10.59.

Making all allowances it would seem proper to accept these as fair figures for the cost of production per bushel and per acre of the corn crop of Illinois in 1896. It will be seen that this result differs materially from those given in the United States reports and in the Crop Reports of Illinois. It must be borne in mind, moreover, that this is the expense of production per bushel and per acre *for the crop of a single year*. It would be absurd to regard this cost as correct for any other year. The figures could not be quoted therefore for 1897, and still less for a period 10 years from now.

It is important to emphasize exactly what this cost represents. It is not the cost of the *growing* merely. As has been indicated, it is the average sum of the expenditures on all the processes involved in production from the preparation of the soil to the delivery at the elevator, including the wages of the farmer himself, whether owner or renter; a proper allowance for time lost, and for maintenance of team during idleness; interest on investment, including rent, and allowance for depreciation of tools and machinery. Anything received for corn above this cost represents pure profit in the economic sense.

Certain other items of interest may be gleaned from the tables. The average number of acres devoted to corn on the farms reported was 60.6. The total amount paid out in rent was $64,333.26.*

* This includes the estimated amounts of rents paid in produce, on the basis of the cost of the produce, and makes an average of $4.00 an acre.

Oats.

After what has been said about the tables on corn, little need be said about those on oats. On the face of the returns the cost of production for the year in question was, up to the stage of hauling to market, 17.8 cents per bushel, and $6.59 per acre. Of these amounts 5½ cents and $2.07 went for labor, per bushel and per acre, respectively; 10 cents and $3.80 for rent; 1.4 cents and 55 cents for seed; and half a cent and 19.6 cents for twine.

The amount of oats hauled was 153,356 bushels from 4031 acres for an average distance of 3.2 miles. The work took 684 days and cost $1491.12. This makes 37 cents per acre, and 9 mills per bushel.

The amount to be included for depreciation and interest in the case of oats may be estimated at about 2.2 cents a bushel and 80 cents per acre. This gives us a final average of 21 cents per bushel and $7.76 per acre for the cost of oats delivered on the market in the season of 1896. This is a larger per bushel cost than is shown for corn and will strike the reader as strange; but it is accounted for by the low average yield. According to the tables the yield of oats was 34 bushels to the acre, which is considerably below the average; while that of corn was 54 bushels, or somewhat above the average. If the oats had shown as high a yield per acre as did the corn their cost per bushel would have been only 14.4 cents.

The lowest cost per bushel was in Cass county, 11.9 cents; the highest in Moultrie county, 58.2 cents. The lowest per acre cost was $4.61 in Bond county; the highest $10.47 in Boone county.

In table 3 the counties are grouped as northern, central, and southern. The grouping is the same as that made for the purpose of holding terms of the supreme court. The table shows in small compass the relative costs of production in the divisions of the State and enables comparison of results to be made with those of the State Department of Agriculture for the same groups.

Conclusions.

A comparison of the results of the present inquiry with those of previous ones shows that the averages in the present inquiry are considerably lower. This is true particularly of the average cost per bushel. In the case of corn the cost per bushel as determined by the Illinois Department of Agriculture in 1886 was 42 cents, and by the

United States Department of Agriculture in 1893, 38 cents; while in the present investigation it is only 19 cents. The differences in the cost per acre, although considerable, are not so striking. It is of course to be expected that the cost per bushel will vary considerably from year to year, the yield depending very much on the seasonal conditions. However, an examination of the tables put forth by the Illinois Department of Agriculture in 1886 and 1887 leads to the conclusion that the Department's estimates of the yield per acre are too low. As said before, the main object of these tables seems to have been to show the relation between the value of the crop and the expense of production. According to the tables there was a loss of about $20,000,000 on the corn crop of 1886, and about $17,500,000 on the crop of 1887, there being a total yield of 182,500,000 bushels in the former year and 129,500,000 in the latter. This would be a loss of 10 cents per bushel in 1886, and 13 cents in 1887. It is hard to believe that the farmers in Illinois were losers to such an amount in those years, or that the price of grain fell so far below the cost of production. Of course no one can deny that the price of grain may fall below the cost of production, but it is not likely to fall very much below, and we cannot suppose that it will do so for many successive years. The same criticism must be passed upon the report of the United States Department of Agriculture. The average yield per acre is probably much greater and the cost of production per bushel much lower than the estimates in these reports.

In the case of oats the table given out by the Illinois Department of Agriculture in 1886 places the cost per bushel at $.288, while the present investigation shows it to be $.184; but there is also an equal discrepancy in the cost per acre, which is $9.80 in the one case and $6.83 in the other. As to the estimate of the yield per acre and its effect upon the average cost per bushel, precisely the same things are to be noted as were noted concerning corn. Further, it must be concluded that the average cost per acre as determined by the Illinois Department of Agriculture in 1886 was too high. The county averages in the present inquiry are almost uniformly lower than those of the Department. This, of course, would very materially reduce the average cost per bushel.

A comparison of the results of this inquiry with those of the State Department of Agriculture in 1897 shows that the averages for the State are nearly alike, with respect to corn.

The average for oats as determined in the present inquiry is about $2.00 less than that of the Department. It should be noticed also that county averages are almost uniformly less. After allowances are made for any elements of cost that do not appear in this investigation, it must still be concluded that the averages published in the recent report of the Illinois Department are too high.

Generally speaking, the results of the inquiry tend to prove that the average cost of production, and particularly the average cost per bushel, is much less than commonly thought. It has always been a puzzle for people to make the customary market price of grain agree with what was the supposed cost of production. It may be unhesitatingly asserted that when all complementary products are accounted for the average market price of grain will rarely fall below the cost of production, and then only for brief intervals.

It would be interesting, if possible, in the comparison of different inquiries of this kind, to note whether there has been a gradual decrease in the cost of production due to improvements in machinery and methods. But the data upon which such a conclusion would have to be based are too meagre and untrustworthy. Satisfactory conclusions in this direction could only be reached by a series of careful investigations extending through a number of years.

Cost of Seed.

Table 4 shows the data from which the average cost of the seed was computed.

REVIEWS AND MISCELLANY.

MIGRATION OF COLORED POPULATION.

To the Editor: —

In the December number of your quarterly a notice of my pamphlet on *The Northward Movement of the Colored Population* points out a source of error which, when properly allowed for, would lead, as your reviewer suggests, to a change in the figures given (at pp. 15 and 18 of pamphlet) to indicate the extent of that movement. I think I can show (if you will allow me the space) that such change would be but a small one.

The source of error is as follows: In table No. 28 of the Eleventh Census, which gives "Native Colored [including Indian] Population, distributed according to State or Territory of Birth," etc., there is a column for "Born in the United States (State not specified)," while *in the corresponding table* of the *Tenth* Census there is *no such column*, and your reviewer correctly intimates that I failed to allow for this omission in that census.

By that (1890) column it will be found that the number then *living in the North*, of colored (including Indian) population, who were returned as natives of the United States, but who failed to give the State of their birth, was 12,417. On a careful examination of the figures (especially noting the figures for some of the Western States and Territories) it will seem certain that as many as 2000 of these were Indians, which would leave 10,417 as the number of native negroes who failed, etc. Now, how many must we take as the number who failed, etc., in 1880? Plainly, the nearest conjecture we can make is by a rule of three calculation. *As* the number of native (United States born) negroes in the North in 1890 (570,120) *is to* the number of same in the North in 1880 (472,556), *so* the number failing, etc., in 1890 (10,417) *is to* the number failing, etc., in 1880; which number will be found to be 8634.

But next, these 8634 were not *omitted* by those who made up Table xxix in the Tenth Census, — as the footing up of the totals clearly shows. They were tabulated as coming from *somewhere* in the United

States. And where was that somewhere? Undoubtedly they were tabulated as "born in" the State where they were living. [I venture to treat the strong probability as a certainty, and this raises to its maximum the error which your reviewer has pointed out.] For instance, in Indiana the few hundreds of American-born colored (negro) population who failed to give the State of their birth were undoubtedly placed *among* the 39,359, who are given as "born in Indiana," and so, of course, in every other State. The result, accordingly, was that in 1880 about 8634 negroes living in the North were put down as born in the *North* when they ought to have been tabulated as "born in the United States (State not specified)."

But next,— where must we suppose that these 8634 were in fact born; that is to say, how many of them must we suppose to have been southern-born, and how many northern-born? The total number of American-born negroes living in the North in 1880 was, as already mentioned, 472,556, made up as follows: —

Tabulated *at random* as northern-born, . . .	8,634
" correctly " " "	283,336
" " " southern-born, . . .	180,586

and it is very clear that the best we can do with the doubtful 8634 is to distribute them proportionately between the two sections, thus: —

Probably born in the North, ...	5,273
" " " " South, ...	3,361

We find, then, that after making allowance for the omitted column in Table xxix of the Tenth Census, the total of southern-born colored (negro) population living in the North in 1880 should be not 180,586 (as given at p. 18 of pamphlet) but 183,947. A *very* small conjectural addition should for similar reasons be made to the number given for such northern-born population living in the South in 1880, which should be not 14,039 (*loc. cit.*) but 14,148.

The final result (after allowing, of course, for a probable death rate) is a change of only 2600 in balance of movement of the colored population from the South to the North during the decade; that is to say, the net gain of the North would be 79,000 instead of 81,600 (as stated at p. 15 of pamphlet).

There is in my pamphlet another source of very slight error, in a failure to allow for a small number of *foreign*-born colored (negro)

population in the North. (In the South, as a whole, the number is so extremely small both absolutely and relatively as to be of no statistical importance.) With your permission, I will state a few results — and very briefly — under this head.

Of this foreign-born population there were, in 1890, 10,768 in the North and 7398 in the South. The number at the North was increasing, and somewhere about 3500 moved in to the entire North during the decade. Massachusetts has a larger number of this class than any other northern State, 2632 in 1890. Florida had in 1890, 4632, probably for the most part from Cuba, and their number was increasing their movement into the State during the decade, being apparently about 2800. This foreign immigration calls for a change in the estimate made (page 15) of the rate of natural increase (in ten years) of the Florida negroes, reducing it from 25 per cent to about 22.6 per cent. In the other southern States the foreign born negro population is utterly insignificant and was decreasing. There is probably no colored emigration to foreign countries worth considering from any part of the United States, and in making calculations as to movement I have assumed — almost necessarily, for there are no attainable data on the subject — that there is none at all.

The fact that the North gained more than 3000, say perhaps 3500, of this population during the decade, more than offsets, when we are calculating the rate of natural increase in the North, the error of 2600 in the northward movement from the South. It is still very clear that the colored population of the North grows little (perhaps about 3.5 per cent in ten years) through natural increase, and that its principal growth is through influx from without.

FREDERICK J. BROWN.

Baltimore, February 26th, 1898.

NATALITY IN MASSACHUSETTS.

Essai sur la natalité au Massachusetts. By Arsène Dumont. Nancy. Berger-Levrault et Cie. 1898.

This extremely interesting monograph of 40 pages is an extract from the *Journal of the Statistical Society of Paris.* The writer has given much attention to the subject of the birth rate of France in his

earlier publications. In his *Depopulation et Civilization* he refers, on page 71, chapter 4, to the low birth rate of the New England States; and in his efforts to explain the low birth rate of his own country he has found certain conditions prevailing in Massachusetts which afford a partial explanation.

The intense energy which is characteristic of the American he attributes to the effect of immigration, which has a tendency to increase the numbers of persons of the healthy, vigorous age of life (15 to 60 years). The percentage of this class in Massachusetts has gradually increased from 60.57 per cent of the total population in 1865 to 64.98 per cent in 1895.

A series of twelve excellent tables is presented showing the movement of the population for a series of years. Special prominence is given to the subject of fecundity of marriage. In table D. on page 13, the figures presented upon this point are generally too low in consequence of the defective method employed. The births in each year are compared with the marriages of the same year, and, while this method will produce fairly correct results in a nearly stationary population, as in France, where the annual growth of the population in 40 years has been less than ½ of one per cent, it cannot produce correct results in a rapidly growing population like that of Massachusetts, where the mean annual growth has been over two per cent. Dr. Farr and other foreign authorities were accustomed to compare the mean births of a group of years with the mean marriages of a group of years six years earlier. Dr. Wilbur of Michigan assumes a period five years earlier, and this is probably very nearly correct for a Massachusetts population.

The following figures from M. Dumont and from the *Twenty-eighth Annual Report of the State Board of Health of Massachusetts*, p. 731, show the differences obtained by the two methods: —

FECUNDITY OF MARRIAGE — MASSACHUSETTS.

Period.	Dumont's Tables.	State Board of Health.	Difference.
1851–55	2.5	2.8	0.3
1856–60	3.0	2.7	— 0.3
1861–65	2.7	3.1	0.4
1866–70	2.5	3.0	0.5
1871–75	2.9	2.7	— 0.2
1876–80	3.1	3.5	0.4
1881–85	2.9	3.1	0.2
1886–90	2.8	3.4	0.6

M. Dumont has treated the subject from the standpoint of the philosopher and political economist. He draws a correct picture of American social life, and concludes that the six hundred millions of population predicted as the population at the end of the next century cannot be attained in the United States under the present conditions.

S. W. A.

STATISTICS OF INFIRMITIES IN NEW ZEALAND.

In the New Zealand census taken April 12, 1896, instuctions were given to make a record of all persons unable to follow their usual occupation by reason of sickness or accident, as well as of those afflicted with certain infirmities. This latter class included the deaf and dumb, blind, lunatics, idiots, epileptics, paralytic, crippled and deformed, debilitated and infirm. The results of the investigation show that 9.94 in every 1000 were suffering from sickness or accident on April 12, 1896, using the word sickness as inability to work on that day, and that besides this there were 7.89 per 1000 in the other classes referred to above.

In 1891 returns from New Zealand and New South Wales for the above classes (sickness, accident, and infirmity) combined were, per 1000 living, as follows : —

	New Zealand.	New South Wales.
Persons	17.83	19.79
Males	20.92	22.90
Females	14.36	16.13

It will be observed that there is a marked difference in favor of females. For males after the period of 35–40, the proportion of sickness rises steadily at each quinquenium of age, while the proportion of accidents is higher at the period 65–70. The rate of sickness per 1000 males living at 35–40 was 5.46, and this increased to 19.08 to 55–60, to 43.66 at 65–70, and to 77.39 at 80 and upwards. In regard to females the sickness is not so great at 30–35 years as at 25–30, but from 35–40 it increases, and from 55–60 very rapidly, though the numbers on which the proportions are based from this time onward are small. The statistics for lunacy show that there is a steady increase. In 1896 one person in every 320, exclusive of Maoris in New Zealand, was afflicted with lunacy.

PROPORTION OF THE SEXES.

An exception to the general rule for male births to exceed female births is found in the native races of the colony of the Cape of Good Hope.

Taking the figures for the colony proper for 1896 the following percentages are given: —

Race.	To each 100 girls.		To each 100 boys.
European	102.37 boys	or	97.69 girls.
Hottentot	104.16 "	"	96.01 "
Fingo, Kaffir, and Betchuana	99.65 "	"	100.35 "
Malay	102.54 "	"	97.52 "
Mixed and other	104.31 "	"	95.87 "
All races,	102.15 "	"	97.90 "
Other than European,	102.02 "	"	98.02 "

Placing the figures above quoted alongside of those given in the census table the following interesting comparison is given: —

Race.	Females alive, 7th April, 1891, to every 100 males.	Females born in 1896 to every 100 males.
Hottentot	91.97	96.01
European	92.38	97.69
Fingo, Kaffir, and Betchuana	101.86	100.35
Mixed and other	101.13	95.87
Malay	107.17	97.52

A comparison of the census results for 1891 and 1875 as regards the old colony, *i. e.*, excluding Griqual and West and the Transkeian Territories, proves that the number of females to every 100 males of each race (except in the instance of the Malays) has increased two and a half per cent for Europeans, Fingoes, mixed and other, including Hottentots, and one-half of one per cent for Kaffirs and Betchuanas.

223 Vol. 6 310 A.

VITAL STATISTICS OF WEST INDIES.

Jamaica. Annual Report of the Registrar-General for the Year ended 31st March, 1897. From the General Register Office, Spanish Town, November 29, 1897, pp. 44.

This report is unusually valuable because it presents vital statistics from other colonies in the West Indies, and the registrar, Mr. S. P. Smeeton, hopes to make these comparative reports more perfect, thus presenting a "complete summary of vital statistics for the West

Indies." It is to be hoped that this very desirable object will be attained. In the following table some recent data for Jamaica and other colonies are given: —

Colony.	Year.	Rates per 1,000 Population.			Illegitimate Births. Per Cent.
		Marriages.	Births.	Deaths.	
Jamaica	*1896	4.6	38.8	22.7	60.8
"	*1897	4.3	38.5	22.1	61.1
British Guiana	1895	..	28	29	72.6
Trinidad	1896	5.94	33.7	26.5	58.1
St. Lucia	1895	6.09	40.4	22.4	59.38
Grenada	1895	5.20	44.93	20.80	49.50
Bermuda	1895	..	32.6	21.7	13.2

*Year ended March 31st.

The very high percentage of illegitimate births naturally evokes the most serious attention from the registration authorities. They say that "so long as the present irresponsibility is possessed by those who cause this stream of social impurity to flow over the land, nothing better can be, indeed worse must be, expected." The remarks of Mr. Frederick L. Hoffman on the "Negro in the West Indies" * are quoted with approval.

CRESSY L. WILBUR.

MORTALITY OF NEGROES.

To the Editor of Quarterly of Statistics: —

In your December number a brief notice of the *Sixth Biennial Report of the North Carolina Board of Health* says: "In a former report it was stated that, contrary to the usually accepted opinion, the negro was less susceptible to malarial diseases than the white man. The reports showed the death rate from that disease to be two and a half to one as against the negro. This fact has only been emphasized by the more accurate report for 1896," etc.

Allow me to correct an inaccuracy in the first sentence above quoted. What the report under review really says is: "In our last report . . . we also adverted to the fact that, contrary to the usually accepted opinion, that the negro was less susceptible to malarial

* *Publications American Statistical Association*, June, 1895.

diseases than the white man. Our reports showed the death rate to be two and a half to one as against the negro," etc., as above.

It is more important, perhaps, to point out that the mortuary statistics in the report are made up only from returns made by certain named cities and towns. "Our vital statistics continue meagre, reports being made only by cities and towns," etc. . . . The few remarks which follow (including the passage quoted) are based on this table. Now less than 10 per cent of the total colored population of North Carolina is found in the cities and towns which have a population of 2500 or more, and from two of these towns (given in the table in the Report) no deaths (of white or colored) from malarial fever are reported, while it is altogether probable that there were no such deaths in Asheville, the returns from which town, however, are not found in the Report, so that the number of urban negroes exposed to malarial influences is but small compared with the total colored population of the State. It is very possible that while a greater population of the colored urban than of the white urban population dies of malarial diseases, at the same time the rural negro may be less susceptible to them than is the rural white man. That the negro in an average malarial country district of the South is less susceptible than the white man to such influences is the view still held very firmly, I believe, by the great majority of southern physicians, although, unfortunately, accurate statistics on this important question do not seem to be attainable.

F. J. B.

OPERATION OF POLL TAX IN IOWA.

In the *Seventh Biennial Report of the Bureau of Labor Statistics of Iowa, 1895–96*, some interesting data are given in regard to the operation of the poll tax in Iowa. In Des Moines there are supposed to be over 10,000 liable for this tax, of which, in 1895, 13 paid it in cash, 4311 worked out the tax. In 1896, 47 paid it in cash, and 4280 worked it out. It cost the city $2500 to collect the tax for each year. Three dollars was the sum to be collected from each able-bodied male citizen between the ages of 21 and 45.

In Sioux City, 2979 persons are liable for this tax. In 1895, 300 of them either paid or worked out the tax, and in 1896, 388 did the same. In 1896 it cost $240 to collect the tax.

In Burlington 3000 persons are liable for the tax. In 1896, 2325 either worked out or paid the tax. It cost the city $237.75 to collect the tax.

In Ottumwa there is a voting population of 4600. The tax levied is $2.50 per year. Deducting one-third not liable, from the fact that they are either too old or physically not able to perform a day's labor, there would be left a population liable for the tax of 3067. In 1896, 1407 paid or worked the tax with $1660 turned over for collection to the county treasurer.

In Council Bluffs the number of persons liable it about 2000. Of this number 861 paid the tax in money or worked it out, in 1896.

In Dubuque, Cedar Rapids, and Keokuk no attempt was made to collect the poll tax.

The total number of persons liable for poll tax in the five cities under consideration is estimated to be 21,146, of which, in 1895, 9283 paid the tax, and in 1896, 9308. "It will be readily seen that considerable less than 50 per cent paid the tax. A law that cannot be applied to more than 50 per cent of the people it is supposed to govern is not a good law and ought to be repealed. In all the cities enumerated will be found the old worn out men and crippled working upon the streets as proxies, yet the law especially stipulates that none but able-bodied men between the ages of 21 and 45 shall perform this labor. There are men in many of the cities under consideration who carry around with them certificates from physicians to the effect that they are not physically able to perform manual labor, yet they are allowed to work out some man's tax who cannot perform such work."

ATHLETICS AND SCHOLARSHIP.

In the *Annual Report of the Provost of the University of Pennsylvania*, 1897, an attempt is made to analyze the relations of athletics to scholarship, as illustrated by the experience of that university. It appears that the number of conditions per student conditioned in the *first* term was: —

	Regulars.	Specials.	Partials.
For all students	1.69	1.7	1.6
For members of athletic teams . .	1.7	1.0	2.5

In the *second* term the same tables show: —

	Regulars.	Specials.	Partials.
For all students	1.9	3.1	2
For members of athletic teams . .	2.1	0.0	2

Considering regular students only: In the first term 155 conditioned out of a total of 499; in the second term 135 conditioned out of a total of 457.

Of athletes we find in the first term 24 conditioned out of a total of 45; and in the second term 16 conditioned out of a total of 45.

"These figures again represent the most favorable enumeration for the athletic class of students, as no attempt has been made to sift out of the total number of 45 those who may have figured solely in the contests peculiar to either term."

During the session 1896–97 there were also 926 students in attendance upon instruction in the Department of Medicine, and of these, according to a report furnished by the Secretary of the University Committee on Athletics, based upon the records of the Committee up to April 7, 1896, 211 students were candidates for positions on athletic teams under control of the University Committee on Athletics, and 714 students of the department were not candidates for positions on the various athletic teams. The average scholastic standing of the students who were not candidates for positions exceeded by 3.1 the scholastic standing of those who were candidates for positions upon the teams. "In this connection, however, it should be stated that in the experience of the Department of Medicine that, with few exceptions during the past several years, the students who were actually athletes, and were recognized as such by the Committee on Athletics, were diligent students and held good scholastic standing in their classes."

TABLE SHOWING THE SCHOLASTIC STANDING OF CANDIDATES AND NON-CANDIDATES (DEPARTMENT OF MEDICINE) ARRANGED BY CLASSES FOR POSITIONS ON ATHLETIC TEAMS.

	Number of candidates.	Scholastic standing of candidates. Per cent.	Number of non-candidates.	Scholastic standing of non-candidates. Per cent.
First-year class.....	70	73.2	215	76.3
Second-year class ..	76	75.2	174	80.3
Third-year class...	50	71.8	191	76.8
Fourth-year class ..	15	73.5	134	70.8

Scholastic standing of 714 non-candidates, 76.5 per cent; scholastic standing of 211 candidates, 73.4 per cent.

AGES OF STUDENTS ENTERING COLLEGE.

In the *Annual Report of the President of the Massachusetts Institute of Technology* statistics are given showing the ages of students at entrance. The table is as follows: —

AGES OF STUDENTS ON ENTRANCE.

Period of Life.	1896-97.		1897-98.	
	Half-year groups.	Yearly groups.	Half-year groups.	Yearly groups.
16 to 16½ years	2	..	1	..
16½ to 17 "	3	5	1	2
17 to 17½ "	19	..	16	..
17½ to 18 "	40	59	33	49
18 to 18½ "	52	..	45	..
18½ to 19 "	44	96	39	84
19 to 19½ "	41	..	58	..
19½ to 20 "	28	69	25	83
20 to 20½ "	23	..	25	..
20½ to 21 "	9	32	9	34
21 to 22 "	..	11	..	9
	....	272	....	261

In the preparation of the above table two students repeating the first year and sixteen of unusual ages were omitted.

From the foregoing it appears that the average age on entrance is eighteen years and eleven months.

There are also presented the ages, at graduation, of the class leaving in June, 1897. The one hundred and seventy-six members of the class were distributed among the different periods of life as follows: —

Between 20 and 20½	1
" 20½ " 21	11
" 21 " 21½	18
" 21½ " 22	26
" 22 " 23	59
" 23 " 24	36
" 24 and over	25
Total	176

THE PRODUCTION AND CONSUMPTION OF ALCOHOLIC BEVERAGES.

A *Memorandum* recently prepared in the Commercial Department of the Board of Trade of Great Britain (summarized in the *Board of Trade Journal*, vol. 24, p. 13) shows the production and consumption of alcoholic liquors in the chief European countries and in the United States. The returns have been compiled from the various official statistics issued by the governments of the different countries referred to, supplemented in many cases by information specially furnished by the various statistical bureaux.

The following statements show the consumption of wine, beer, and spirits, together with the proportion per head of the population, in the latest years for which the data are available, in the United Kingdom, France, Germany, and the United States: —

WINE.

Years.	United Kingdom.		France.		Germany.		United States.	
	Consumption.	Per Head of the Population.	Consumption.	Per Head of the Population.	Consumption.	Per Head of the Population.	Consumption.	Per Head of the Population.
	Gals. Thousands.	*Gals.*	*Gals. Thousands.*	*Gals.*	*Gals.*	*Gals.*	*Gals. Thousands.*	*Gals.*
1885	13,768	0.38	815,364	21.34	.....	....	18,243	0.32
1888	13,417	0.36	881,056	22.94	.....	....	30,267	0.51
1890	14,924	0.40	793,870	20.67	76,340,000	1.54	24,121	0.38
1895	14,553	0.37	940,368	24.43	55,198,000	1.06	16,363	0.23
1896	15,776	0.40	1,137,224	29.50	.....	....	16,578	0.22

From the above it appears that the consumption of wine per head of the population in the United Kingdom, Germany, and the United States is insignificant; whilst as regards the total quantity consumed it is to be noted that in these three countries taken together with their 150 millions of inhabitants it is approximately a tenth part of what is consumed in France with its 38 millions of inhabitants.

BEER.

Years.	United Kingdom.		France.		Germany.		United States.	
	Consumption.	Per Head of the Population.	Consumption.	Per Head of the Population.	Consumption.	Per Head of the Population.	Consumption.	Per Head of the Population.
	Gals. Thousands.	*Gals.*	*Gals. Thousands.*	*Gals.*	*Gals. Thousands.*	*Gals.*	*Gals. Thousands.*	*Gals.*
1885	975,645	27.1	182,952	4.6	908,292	19.8	476,578	8.8
1888	1,003,475	27.2	178,222	4.4	1,015,916	21.5	639,400	10.7
1890	1,124,525	30.0	189,838	4.8	1,142,042	23.3	712,875	11.4
1895	1,160,127	29.6	196,548	5.1	1,215,676	23.5	869,062	12.4
1896	1,211,529	30.7	199,122*	5.2	1,333,090	25.5	900,161	12.7

* Proof gallons containing 50 per cent of alcohol.

The two great beer-producing countries are Germany and the United Kingdom, the production in Germany being slightly the larger in bulk, but in the matter of consumption per head the positions are reversed. The production in the United States is increasing, but the consumption per head averages, roughly speaking, only half that of Germany, whilst in France it is not a fifth of that of the two great beer-drinking countries. It may, however, be remarked that as regards consumption, Belgium, where more than 43 gallons of beer are consumed per head of the population, stands higher even than England or Germany, and higher indeed than any individual state of the latter country except Bavaria, where the consumption is highest of all, amounting to no less than 50 gallons per capita.

SPIRITS.

Years.	United Kingdom.		France.		Germany.		United States.	
	Consumption.	Per Head of the Population.	Consumption.	Per Head of the Population.	Consumption.	Per Head of the Population.	Consumption.	Per Head of the Population.
	Gals. Thousands.*	*Gals.**	*Gals.* Thousands.*	*Gals.**	*Gals.* Thousands.*	*Gals.**	*Gals.* Thousands.*	*Gals.**
1885	34,515	0.96	63,536	1.69	....	....	58,810	1.05
1888	34,138	0.92	64,592	1.69	74,580	1.58	63,179	1.05
1890	38,374	1.02	73,172	1.91	101,024	2.07	73,161	1.17
1895	39,043	1.00	68,156	1.78	97,746	1.89	64,831	0.98
1896	40,076	1.01	70,180	1.85	100,760	1.94	59,186	0.83

* Proof gallons containing 50 per cent of alcohol.

From the above it appears that the consumption of spirits in the United Kingdom and the United States does not differ very materially, averaging in each instance about one gallon per head. In France, and in Germany, also, the case is, however, altogether different, for here the consumption over a series of years averages more nearly two gallons per head than one. . . .

As regards the question of the taxation of alcoholic beverages it is stated in the memorandum that the United Kingdom, France, Germany, and the United States all derive large revenues from the taxation of such beverages, the actual proportion so derived to the total revenue being in the case of the United Kingdom 35 per cent; in France, 19 per cent; in the United States, 30 per cent; and in Germany, 17½ per cent; and it is in these countries that the amount of drink consumed is the largest.— *Board of Trade Journal*, London, volume xxiv, number 138.

COMPARATIVE CRIMINAL STATISTICS.

The following summarized report is reprinted from *Notes on the Subjects Discussed at the St. Petersburg Meeting of the International Statistical Institute*, presented by Major P. E. Craigie at a meeting of the Royal Statistical Society: —

M. Tarnovsky read a paper, which presented features of special interest, on the proportion of *Acquittals to Offences and Crimes in Russia from 1889–93.* He thought that sufficient attention had not hitherto been given to the numerically recorded results of the different systems of jurisdiction in vogue in the great European countries. There were difficulties owing to the varied forms of criminal procedure, but points for comparison might be found in such questions as the relative proportion of acquittals by different tribunals.

In general there were more acquittals in trials by jury than without. He gave a table illustrating this by the proportion of acquittals for every 100 persons tried in a court of first instance in the following countries: —

	With Jury.	Without Jury.
Russia (1889–93)	34	26
France (1889–93)	29	7
Austria (1883–93), excluding Hungary	26	14
Germany (1889–93)	25	13

These figures were, however, not entirely homogeneous, as in Russia notably the *tribunaux d'arrondissement* try in the first instance more than half their cases with the assistance of a jury, whilst in the other three countries the number of cases tried by a jury does not exceed 5 or 6 per cent of the total cases tried by a court of first instance, and in France the proportion is even less than 3 per cent. But if only those cases are taken for Russia, which are tried both in France and Russia equally with the assistance of a jury, the proportion of acquittals for Russia would be 32 per cent, as against 29 per cent for France.

The figures quoted show that both jury and magistrates are more indulgent in Russia than in Western Europe, but it is especially remarkable that the difference is much greater for the courts which try cases without the assistance of a jury than for those which have a jury. Moreover, in Germany and Austria the jury acquits twice, in France as much as four times, as often as the State tribunals (*tribunaux d'Etat*). In Russia the jury only acquits to an extent of one-third more than the magistrates.

The high proportion of acquittals in Russia is due to a variety of reasons, which render criminal procedure slow and insecure; chief of these is the immense area of the different judicial districts, which on an average occupy in Russia 40,000 square kilomèters, while in Germany and Austria they consist of 3000 to 4000 square kilomèters, and in France of only 1000 square kilomèters. In the same way a court of first instance in Russia has to deal with 1,200,000 inhabitants, in Austria with 370,000, in Germany with 300,000, and in France with only 110,000.

The greater indulgence of a jury becomes especially noticeable when regard is had to the sex of the accused. In Russia juries, on the average, for the period 1889–93, acquitted 34 per cent of the

men and 51 per cent of the women. The corresponding acquittal figures for France during the same period were 25 per cent men and 49 per cent women. Magistrates, on the contrary, hardly make any difference between the sexes. In Russia they acquitted 26 per cent men and 25 per cent women in the *tribunaux d'arrondissement*, and in France 6.6 per cent of the men, and 9 per cent of the women.

Making a comparison of the crimes which are almost identical in the two countries, France and Russia, the following table shows the proportion of acquittals by a jury: —

Russia.		France.	
Offences.	Acquittals per Cent.	Offences.	Acquittals per Cent.
Forgery (*Faux Divers*)	57	Wounding and assaulting	45
Destruction of property (incendiarism)	50	Forgery (*Faux Divers*)	39
		Breach of trust	39
		Destructton of property	37
Swindling and breach of trust	50	Uttering false coin	34
		Offences against morality	33
Offences against morality	48	Homicide	31
Wounding and assaulting	45	Robbery without violence	19
Uttering false coin	39	" with "	14
Robbery with violence	38	Sacrilegious robbery	9
Homicide	34		
Robbery without violence	27		
Sacrilegious robbery	26		

The causes producing the proportion of acquittals in the various offences are thus almost the same in the two countries; habitual criminals have much less chance of being acquitted either by a jury or a magistrate than first offenders. Recidivism is most frequent among the various forms of theft and robbery, while, further, these offences are generally not very complicated, proofs being readily obtainable. But forgery and breach of trust are very different; here the offenders are generally educated persons, who can make a good defence, and thus are the more likely to obtain an acquittal. The same analogy can be showed, though to a smaller extent, in the acquittals of courts without a jury, as, taking the same quinquennial period 1889–93, the following table shows: —

Russia. Tribunaux d'arrondissement without a Jury.		France. Tribunaux correctionels.	
Offences.	Acquittals per Cent.	Offences.	Acquittals per Cent.
Libel	54.5	Libel	30.8
Wounding and assaulting	49.5	Perjury	23.4
Destruction of property	38·1	Manslaughter	16.2
Swindling, breach of trust	37.6	Swindling, breach of trust.	10.4
Perjury	37.0	Offences against morality.	7.0
Homicide	25.0	Wounding and assaulting.	6.3
Rebellion and assaults on officials	16.0	Destruction of property	6.2
Theft	13.7	Theft	5.7
Vagrancy and Begging	6.0	Vagrancy and Begging	2.4
		Rebellion and assaults on officials	2.3

The greatest proportion of acquittals by a jury are reported from Southern Russia. But, as regards acquittals in decisions by magistrates without a jury, the most indulgent districts are those in the west, although the juries in these same districts are severe; so much so that in 11 courts (*tribunaux*) in the west and northwest of Russia in Europe the magistrates acquit more often than the jury.

STATISTICS OF TRADE UNIONS.

The *Ninth Report of the Chief Labor Correspondent of the Board of Trade* on Trade Unions deals with the statistics for 1896.

Year.	Total Number of Trade Unions.	Membership of All Trade Unions. Thousands.	Membership of 100 Principal Trade Unions. Thousands.
1892	1,184	1,461	913
1893	1,239	1,453	917
1894	1,285	1,424	931
1895	1,316	1,397	921
1896	1,330	1,487	966

From the returns received it appears that there are 127 trade unions that have female members, the aggregate number of such members amounting to 108,578.

The following table shows the amount of expenditure for different purposes of these unions: —

AMOUNT OF EXPENDITURE BY 100 PRINCIPAL UNIONS.

Class of Expenditure.	Amount of Expenditure in Thousand Pounds.				
	1892.	1893.	1894.	1895.	1896.
Unemployed, etc. benefits	349	459	463	438	285
Dispute benefit	357	594	158	190	155
Sick and accident benefits	208	240	229	263	246
Superannuation benefit	102	112	122	131	141
Funeral benefit	69	75	69	76	75
Other benefits and grants	82	123	122	49	64
Working, etc. expenses	251	252	280	258	270
Total	1,420	1,858	1,446	1,408	1,239

NOTES.

An illustration of the difficulty of using statistics of institutions where delinquents are kept is furnished by the *Report of the State Work-house and House of Correction*, in *The Twenty-ninth Annual Report of the Board of State Charities and Corrections of Rhode Island, 1897*. In 1897, 852 persons were committed to the institution as compared with 829 in the previous year, thus showing an increase of 23. At the close of 1897, however, there was a smaller number in the institution than at the close of 1896. These apparent inconsistencies are reconciled by the fact that more inmates were discharged during the year than previously.

It is noted that the offences for which persons had been committed during the past two years as given from the mittimuses have changed, but this improvement is due in a measure to a variation in the names of offences; for example, the number of persons convicted as being drunkards is less than in the two immediately preceding years. At the same time the number of the vagrant class is largely increased. About 40 per cent of the persons committed in 1897 were of foreign birth, 75 per cent were wholly and about 5 per cent were partly of foreign parentage.

In *Bulletin No. 10 of the United States Department of Agriculture* (Section, Foreign Markets) entitled our *Foreign Trade in Agricultural products during the Five Fiscal Years 1893–97*, attention is called to the fact (p. 13) that in the preparation of statistical tables employed in this bulletin the classification of agricultural imports and exports used in similar statements previously issued by the Department has been subjected to a careful revision. The list of products included has been increased by the addition of several commodities. Most of these commodities are of small value, the only change of any considerable importance is the inclusion for the first time of malt and spiritous liquors. This seems to be justified on the ground that the commodities mentioned, although secondary products, are as purely agricultural in their original source as several other articles which it has been the custom to include, such as sugar, glucose, starch, flour, butter, cheese, margarine, lard, tallow, animal and vegetable oils, cider, vinegar, wines, etc. These secondary products form a very important part of the agricultural catagory, and any statement from which they are excluded would fail to convey an adequate idea of the extent to which agriculture enters into our foreign trade.

In the *Seventh Annual Report of the Charity Organization Society of Hartford, Conn., 1897*, a table is presented showing the causes of need of applicants for relief. The principal causes may be thus summarized: —

	Resident.	Non-Resident.
Intemperance	309	128
Intemperance combined with other causes	44	5
Sickness	132	3
Sickness combined with other causes	13	0
Extravagance	39	9
Lack of employment	39	8
Inefficiency	65	7
Disagreeable dispositions	24	0
Aversion to work	20	6
Accidents	14	3
Physical defects	12	5
Old age	12	3
No male support and large family	32	0
Neglect by relatives	17	0
Dishonesty	22	34
Licentiousness	17	9
Not in need	225	20
Other causes		
Total	1076	284

The *Thirteenth Annual Report of the Bureau of Labor Statistics for the State of Connecticut for the year ending November 30, 1897*, contains (pages 189–198) tables showing the rates of wages, the hours employed, and the method of payment of employees in various industrial departments of municipalities in Connecticut.

Number 5 of the *Michigan Monthly Bulletin of Vital Statistics* (January, 1898) contains a table showing the comparative mortality of Michigan, Connecticut, New York, and Ontario during the last four months of 1897. This consolidated report is based upon data collected by those states and furnished to the Michigan bureau. Connecticut, Michigan, and New York had an aggregate population at the last United States census of 8,838,000, about 14.11 per cent of the population of the United States. The population of Ontario in 1891 was 2,114,321. These tables are therefore based upon returns from nearly a seventh of the population of the United States and Ontario. The table shows the mortality rates for various diseases, and shows the per cent of deaths under five years to total deaths.

The birth rate in New Zealand in 1896 was 26.33 per thousand, showing a steady decrease since 1891. At the same time the number of marriages to the population has been increasing. In 1881 there were in New Zealand 5.72 births to every marriage in the previous year, and in 1896 the proportion had fallen to 4.32 to each marriage. In 1880 New Zealand had the highest birth-rate of all the Australian colonies, 40.78, but now the proportion is just reversed, excepting in case of Western Australia.

In the *Second Report of the Registrar of Births and Deaths of the Cape of Good Hope*, 1896, statistics are given for illegitimacy. The births of children belonging to the mixed, other and Hottentot races with Malays amounted in 1896 in the colony proper only to 12,840 in all, 6552 being boys and 6288 girls. Of these 3938 were illegitimate, consisting of 2004 males and 1934 females, giving the following percentage proportions, *viz.*: —

Illegitimate births to total mixed and other births (colony proper only)	30.67
Male illegitimate births to total male births	30.59
Female illegitimate births to total female births	30.76

In Trinidad the percentage of illegitimacy for Coolie births was 80.30 (*Registrar-General's Report* for 1891).

SAUERBECK'S PRICE INDEX.

Mr. Sauerbeck makes the following statement to the *Journal of the Institute of Bankers* in regard to the course of prices to the end of 1897 : —

The annual index numbers of the prices of 45 commodities, the average of the 11 years 1867–77 being 100, are : —

Average.		Average.	
1878–87	= 79	1891	= 72
1888–97	= 67	1892	= 68
	—	1893	= 68
1880	= 88	1894	= 63
1888	= 70	1895	= 62
1889	= 72	1896	= 61
1890	= 72	1897	= 62

The index number for last year is one point better than that for the preceding year, or the same as in 1895. As the low figure of 1896 was mainly caused by unprecedentedly low prices, in the aggregate, of articles of food, so the number of 1897 was principally affected by the opposite course, higher prices of food, while the average of all materials was the lowest on record. Amongst the articles of the first class, wheat, barley, oats, potatoes, rice, and all sorts of meats, and particularly pork, were higher; but sugar, coffee, and tea declined and ruled, on the average, lower than ever before. In the case of materials there was a moderate improvement for copper, tin, lead, and coals, but all textiles — cotton and wool, flax, hemp, and jute — and a number of sundry materials — *viz.*, tallow, linseed oil, petroleum, nitrate, and indigo — ruled lower. Timber and soda, on the other hand, were higher.

. . . . . .

Taking articles of food and materials separately the index numbers compare thus : —

	Feb.	Dec., 1895	July	Dec., 1896	May	Sept.	Dec., 1897
Food	63.8	60.4	60.0	63.9	63.7	67.5	66.5
Materials ..	57.0	61.8	58.6	60.6	59.4	60.4	59.4

The course of prices during last year was strongly influenced by the rise of wheat in the second half and by the fall of cotton in the last quarter. While articles of food stand still 4 per cent higher than in December, 1896, and 11 per cent above the lowest point in July, 1896, materials are 2 per cent lower than a year ago, but still 4 per cent higher than at the lowest period in February, 1895.

Ten descriptions out of 45 contained in my tables showed records of lowest prices — *viz.*, sugar (two descriptions), flax, Manila hemp, jute, tallow, linseed oil, and nitrate the lowest of the century, and Brazil coffee and indigo the lowest since 1852.

Owing to the introduction of the gold standard in Japan the export to that country was entirely stopped, but there was a good demand for India, and, as in the previous year, silver was strongly favored by the Russian currency requirements. It appears that fully one-third of the world's total production was taken for that purpose. A year ago, and again in September, I called attention to this great demand, and it may be useful to inquire how much silver will really be required by Russia. It is the intention to replace all one and three rouble notes by silver, and as of these 233,000,000 roubles were issued, it would at 18 grammes fine silver require 4,200,000 kilos, or 146,000,000 oz. standard. It is difficult to know the exact amount actually taken, as the complete Russian statistics are not to hand, but I estimate that the net quantity during the last three years, after allowing for industrial consumption, reached about 2,700,000 kilos. fine, equal to 94,000,000 oz. standard, or 150,000,000 roubles. As it is reported that only 106,000,000 roubles have so far been coined, there must be a considerable stock of silver on hand, while the quantity still to be purchased would on this basis amount to about 52,000,000 oz. standard, equal to about 30 per cent of one year's production of the world. It is assumed in this calculation that the quantity of old silver coin in Russia will be sufficient for small coins.

With regard to the general state of trade in Europe during the past year opinions appear to differ, but I believe there is plenty of evidence that the result was, on the whole, less favorable than that of 1896 and the second half of 1895. The famine in India and the outbreak of plague seriously impeded the trade with this great dependency, and there was also a considerable reduction in the exports to the Far East, to Australia, and South America. The change in the tariff of the United States, while stimulating exports there during the first half of the year, caused a complete stoppage of demand later on. The textile industry, particularly of cotton and wool, was very depressed, and though the good demand for iron and other metals continued throughout the year the engineering trade in this country was greatly hampered by the protracted strike. The harvest on the Continent

was bad, causing a rise in the prices of breadstuffs, while large sugar crops and unprecedented crops of American cotton and Brazil coffee had a depressing influence on these articles.

In the United States, on the other hand, things were much better. Prices of wheat were already good last winter, and in view of a protective tariff there was considerable speculation in raw materials and manufactures, to be followed in the latter part of the year by the fortunate coincidence of a good harvest and high prices of wheat. The exports show again, as in the previous year, an enormous excess over the imports, about $350,000,000, and this must soon increase the demand for foreign goods again, notwithstanding the high duties. The settlement of the currency makes, unfortunately, no progress, although with a little good will and only a moderate amount of gold it could be placed in a sound position.

The future of prices of raw materials will depend on the American demand and on any improvement in the condition of the East and of other extra-European countries, which, in my opinion, cannot be very far distant, but the geueral index number may be affected by any weakening in the now exceptional prices of wheat, and this must occur as soon as larger quantities are again brought to market.